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RURAL DEVELOPMENT TEAM
FROM
UNITED STATES DEPARTMENT OF AGRICULTURE
US/AID, and
ASSOCIATION OF STATE UNIVERSITIES
and LAND-GRANT COLLEGES
on
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in
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PREFACE

In response to a request from the Ministry of Agriculture for advise in programming national agriculture and rural development a Team representing the Land Grant Colleges, the United States Department of Agriculture and the Agency for International Development was sent to Bolivia on April 14. The group spent seven weeks studying Bolivian agriculture - its present status, its place in the Bolivian economy, its needs - and reviewing the organization of the Bolivian Government relative to resource use, agricultural services, education, research and rural development.

The Team has made recommendations in these areas and has suggested types of technical assistance that it believes are needed and can be used to improve the agricultural economy.

Community development, while not dealt with in this report, is recognized as a major element of the rural development program, and is treated in an E-1 Project Proposal of the Mission which will be submitted as part of the FY '65 program.

The Team consisted of Coordinator Kenneth A. Butler, Program Director, O.I.G., U.S. Dept. of Agriculture; Howard A. Osborn, Agricultural Economist, Economic Research Service, U.S.D.A.; Henry M. Hansen, Associate Director of Extension, University of Connecticut; B. Delworth Gardner, Economist, Utah State University; D. Wynne Thorne, Director of Research, Utah State University; C. David Anderson, Community Development Advisor, AID; and Milton J. Lobell, Director Rural Development Division, AID, La Paz, Bolivia.

During the time the Team was in Bolivia, meetings and discussions were held with U.S. AID and Embassy personnel, officials of the Government of Bolivia and of organizations working with the Government. Visits were made to all major agricultural areas of the country and to colonization projects and the Team talked with many campesinos, colonists and spontaneous settlers. (Appendix A). The work program of the Team is shown in Appendix B.

The Team expresses its appreciation for the helpfulness and thoughtfulness of AID and Embassy employees and to Mr. Eduardo Palomo, who served as guide, interpreter and counsellor to the group.

INTRODUCTION

Prior to departing for Bolivia the team met in Washington with representatives of the Agency for International Development, the U.S. Department of Agriculture, the U.S. State Department, and the Association of Land Grant Colleges and State Universities. Background information on Bolivian agricultural programs was presented and previous reports on Bolivia were discussed.

The detailed information on Bolivian agriculture provided by previous study groups is not repeated.

In this report justification is presented for increased investment support for the agricultural sector. The argument is advanced that investment alternatives in agriculture are yielding high returns, especially those that are used with large quantities of land and labor.

Economic development is of primary concern to Bolivia at the present time and strong economic criteria should guide investment decisions. Some impressions are given at the close of the first section as to general areas in agriculture where investment returns seem to be especially promising.

The section on present status and potential of Bolivian agriculture examines some of the theoretical aspects of production and marketing in relation to the direction of possible future development. The size of the resource base in relation to population indicates that production development must be closely oriented to market development. Production and marketing comments are provided for a number of agricultural commodities.

Present agricultural education, research, and extension programs were reviewed and recommendations are made to increase their contribution to the agricultural sector of the economy, including development of rural areas. Evaluation of programs and study of administrative organization revealed need for program coordination both within and between agencies to use more effectively present personnel and finances in serving rural people. It was clearly evident to the team that more resources both human and financial must be allocated to strengthening the programs of education and research if Bolivia is to develop agricultural and natural resources which are basic to the future growth of the total economy.

The report closes with recommendations directed toward the establishment of a new ministry to include the rural development activities of the Ministry of Asuntos Campesinos and the Ministry of Agriculture. Recommendations are made directed at preparing the way for the integration of activities and for strengthening the functions of the Ministry of Agriculture pending the establishment of the new ministry.

SUMMARY OF RECOMMENDATIONS

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SECTION I

No specific redommendations are made in this section but guidelines are set forth for the investment of capital in the agricultural enterprise.

SECTION II

Credit

28

The Team recommends that the Government of Bolivia or AID subsidize The Banco Agricola to permit more small loans to be made and collected.

Fertilizer

29

The Team recommends that if construction of a fertilizer plant is not feasible at this time the Government institute programs to encourage the use and develop markets for fertilizer by reducing distribution costs and prices of fertilizers and encouraging their import.

Market Information

30

The Team recommends providing market news information on major agricultural products in major markets by radio. This should be timed to be the most value for the main market days.

Institutional Farms

31

It is recommended that the agricultural production of government enterprises be phased out and that food supplies be purchased on the open market or by contract.

Cooperatives

32

The Team recommends that the coop program be closely associated with rural development and community organization programs.

Wool

33

Current efforts of COMBOFLA and SAI to improve the wool quality of domestic sheep should result in substantially higher quality wool that should substitute for wool imports within a period of very few years. Present programs in sheep and wool production should be continued.

An American technical advisor experienced in management and operation of a wool processing plant is needed to help COMBOFLA in the domestic manufacture of local raw wool supplies.

The ability of some industrialization to further increase national income from wool poses the problem of private or public investment and profit. The monopoly character of COMBOFLA and the degree of profit to be achieved from "tops" making poses a pricing problem if private enterprise were to intervene in the marketing system. It is proposed here that an industrial division of COMBOFLA be instituted with some of the profit from manufacturing accruing to a special fund for industrialization of agricultural products.

A beginning of a program for selection breeding and improved nutrition is being made by SAI at the Belen and Patacamaya Experiment Stations. Efforts along these lines should be increased.

Jute

35

Bolivia imports annually about \$700,000 worth of jute bags. Since jute and similar fibers can be produced domestically this suggests an area for potential savings of foreign exchange as well as contributing to industrialization and agricultural production. The financial feasibility of establishing a plant for this capacity should be investigated. It is recommended that the USAID give consideration to such a feasibility study.

Fats and Oils

35

Establishment of an oil seed mill in the Santa Cruz area should have the highest priority.

Livestock Products

35

Work on breed improvement should be continued and amplified. Work on cost and return of high rates of feeding at the campesino level should be undertaken to demonstrate the feasibility of raising corn for hog feeding. This will be of particular advantage to so-called surplus corn producing areas and areas with excess productive capacity.

Milk

37

The Team recommends no assistance to the milk plant under present management policies. The milk plant could perhaps be taken over by a COMBOFLA type Marketing Board or by the producers.

Tropical Wheat

37

The Team recommends no U.S.A. inputs into tropical wheat research. This can more profitably be carried out by larger and richer countries than Bolivia. We see nothing against continuing low level experimentation and promotion by the Bolivian Government, but counsel against putting too much resources into this unproved enterprise.

Temperate Wheat

38

The Team recommends that policies affecting the milling of domestic wheat be examined and that barriers to the production and marketing of domestic wheat be removed.

Rice and Grain Marketing

39

The Team recommends that a grain marketing board be established to formulate price and marketing guides for rice, wheat, and soybeans with authority to purchase crop surpluses or make crop loans as a guarantee of their pricing policies but with the expectation that under normal circumstances they will not enter the market.

Corn

39

Surplus capacity for corn production exists in many areas of the country. While growers complain of low prices little effort appears to be made to feed hogs for rapid gain. As mentioned under notes on meat the economies of feeding corn should be established and promoted.

Tropical Fruit

40

We would recommend high priority in continuing the development of a market for tropical fruit to capitalize an excess production that currently has little or no market and to contribute to foreign exchange earnings. Better development of fruit marketing will benefit the domestic economy and will also contribute to improving transportation and marketing connections with Argentina that eventually should benefit other crops and both countries.

Potatoes

41

It is recommended that studies on potato varieties and production practices be continued and that the efforts to increase and distribute seed of improved varieties be increased.

SECTION IIIHigher Education

42

At this time Bolivia cannot adequately support more than one institution of agricultural education at the university level. Therefore it is suggested that for the present time major emphasis be aimed at strengthening the program at the College of Agriculture at the University of Cochabamba. In developing agricultural education at Cochabamba the program should be broadened and its name might appropriately be changed to the "College of Agriculture and Natural Resources".

Create a faculty and curriculum in Homemaking Education at University of Cochabamba. Presently there is no university level homemaking education available in Bolivia. Such training is essential to prepare teachers of Homemaking and Home Demonstration Extension Agents.

Establish a contract with a Land Grant University to provide staff to assist with implementation. Such a contract could replace the United Nations project which is scheduled to be terminated in February 1965. For a Land Grant University Contract to be effective it appears mandatory that the University agree to the following conditions:

1. That the University administration, including the Dean of Agriculture, have the authority to make changes in the agricultural curriculum and staff assignments to effectively strengthen the course of study including research in agriculture.
2. That professional staff salaries be increased and based on merit to facilitate the employment of the most competent full-time teachers and researchers to serve as counterparts to contract personnel.
3. That the Government of Bolivia and the University develop plans giving evidence of how the program will be continued following termination of the contract.

Evaluate the desirability of establishing a University of Agriculture as an independent institution but a part of the University system in Bolivia.

Provide for adequate and continuing financing by Government of Bolivia, USAID, and other agencies as appropriate with plans for all financing to eventually come from within Bolivia.

Secondary Education

The need for training in agriculture on the vocational level seems very evident as a means of increasing the competence of future farmers and technicians working with agriculture. The same situation appears to be true in homemaker education for young women. It is recommended that a study be undertaken by a qualified team in the near future. This study could be appropriately supported by USAID and should include a thorough analysis of the present situation and future needs for vocational agriculture and homemaking education in Bolivia. Additional investigation may confirm the need for a study of the entire education system in Bolivia which would include the above recommendation.

Research

The Team recommends the establishment of a Division of Agricultural Research within the Ministry of Agriculture and placed under it the

various experiment stations and demonstration farms now operated by SAI and such other similar units supported by funds of the Bolivian Government.

Major research personnel and effort should be concentrated at Belen, Saavedra, Cochabamba, Trinidad and Chipiriri. A smaller research program should probably be continued at Chinoli. 45

Close working relations should be developed between experiment station and extension personnel. Where possible extension personnel should be officed at the experiment stations and should participate in planning station programs and take the lead in field days and short courses. 46

A central Research Service under the Division of Agricultural Research should be established 46

Research not limited to the experiment stations can be best done by a central research group. This central group should be men of the highest quality and their responsibilities should be country wide. Because of their broad responsibilities and distinctive capabilities they should also serve as advisers and associates in planning for work at the experiment stations. Some of the units that should be located in this group are: 46

1. Research personnel responsible for characterizing, inventorying, and developing use plans and criteria for best use of renewable natural resources.
2. Research personnel in economics and marketing. Needs for these studies are emphasized in other sections of the report. Particular emphasis should be placed on the evaluation of returns from investments in various programs.
3. Studies on motivation and cultural changes.
4. Special studies on livestock parasites and diseases.

Financial support of research as well as planning and evaluation should be on a project basis with complete plans and reports being reviewed not less than once each year. 47

Salaries and working relationships should be improved so that the most capable personnel can be retained. 47

Agricultural research in Bolivia by all foreign missions should be in cooperation with the Division of Agricultural Research. In order that the efforts may be properly coordinated a planning committee should be established consisting of the head of the Division of Agricultural Research and the leader of each mission. 47

The conduct of this research should be by Bolivian specialists under the supervision of the division of research of the Ministry of Agriculture. Since, however, adequately trained and experienced researchers are not now available in all areas needed it is proposed that U.S. technical assistance be continued for at least five years. During this period technical assistance should gradually be phased out as Bolivian specialists demonstrate capacity to carry on the investigations. High quality technical assistance in research could be best provided by contract with a Land Grant University or the U.S. Department of Agriculture. This relationship would be particularly appropriate if the British Team provides assistance in studies on tropical agriculture.

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Agricultural Extension Service

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The Team recommends:

1. The Government of Bolivia adopt appropriate legislation to legally establish the Extension Service as an agency of the Government including authority for necessary financial support, to provide for realistic growth of staff in numbers and competence and in addition provide for needed operating costs.
2. The elimination or transfer to the Extension Service with provision for funding as appropriate all agricultural extension type work for rural areas now being conducted by other agencies of Government.
3. Broadening the scope and program objectives to include rural development as a major responsibility of the Extension Service in addition to the traditional programs in agriculture, home demonstration and 4-S club work.
4. Providing more program supervision and appropriate specialist assistance to all provincial agents. This can be done through the establishment of regional Extension Centers located in La Paz, Cochabamba, and Santa Cruz. The present three positions of USAID extension advisors should be continued in present locations with Bolivian counterparts to direct work in the region.
5. As funds and technical staff become available extension work should be expanded to effectively serve all provinces in Bolivia.

Constant attention must be given to up-grading staff and the payment of adequate salaries to maintain and attract competent personnel. New positions should not be established until and unless existing staff and programs are adequately supported.

6. In so far as practical the provincial office space and gas and oil expenses of vehicles should be provided from sources within the province. Such a policy is intended to indicate local interest and support for extension work. To facilitate and implement this policy local sponsoring committees should be established to support and guide the extension program.
7. Improved and expanded information services should be supplied to effectively reach more people.
8. That extension personnel at all levels develop and maintain effective working relationships with the agricultural research and demonstration centers, peace corps, Heifer project, schools and such other agencies as may be helpful in carrying out their extension responsibilities.
9. The employment by USAID of a qualified person to advise the Extension Service on a national basis and assist in its development appears very essential.

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SECTION IV

Rural Development

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It is recommended that the rural development functions of the Ministry of Asuntos Campesinos and those of the Ministry of Agriculture, together with supporting functions, be merged into one organization to be known as the Ministry of Rural Development.

It is anticipated that some time will be required in which to complete the organization of the new ministry. In order to prepare the ground and smooth the integration of activities the following steps are recommended.

52

1. Complete as rapidly as possible the transfer of SAI functions to the Ministry of Agriculture.
2. Eliminate duplication in administrative operations of the Ministry of Agriculture and effect changes in practices and procedures necessary to bring a high degree of efficiency to the conduct of the business affairs of the Ministry.
3. Transfer to the Extension Service all agricultural extension type work for rural areas now conducted by other agencies of government.
4. Establish within the Ministry of Agriculture a division of Agricultural Research, with responsibility for all research and demonstration farms.

5. Set up in the Ministry of Agriculture a division of agricultural cooperatives.
6. Establish a division of marketing to have supervision over operation and development of marketing boards, and establishing and regulating grades and standards.
7. Strengthen soil and water conservation, range management and forestry work to improve the utilization of soil and forest resources and to protect against uneconomic exploitation.
8. Draw all colonization development into one agency under CBF and set up staff functions for selection, planning, and implementation that will service present and future colonies. Transfer to the colonization agency those colonization functions now performed by the Ministry of Agriculture.
9. Small irrigation efforts should be consolidated within the new Ministry which should also manage the Angosture and Tacagus projects. The Villa Montes project should be kept with the colonization program. 53
10. Transfer the Meteorological work of the Ministry of Agriculture to a more appropriate agency. Meteorological stations should be continued at the research stations.
11. The Team believes that security of tenure is essential to the development of public servants of high competency and it is recommended that USAID give support to the establishment of a national civil service system.
12. It is recommended that a team of advisors consisting of a specialist in public administration, an economist and a person experienced in the general field of agricultural research be available for up to two years to guide the process of reorganization.

SECTION I

AGRICULTURAL DEVELOPMENT IN BOLIVIA, JUSTIFICATION, PRIORITIES AND PROGRAMS

A. Justification for Agricultural Investment

1. The Importance of Development in the Agricultural Sector

About 70 percent of the Bolivian population of 4 million in 1962 is employed in agricultural production. It has been estimated that about 34 percent of the national income derives from the agricultural sector, U.S. \$136 million out of a total of U.S. \$446 million in 1962.

The rural people seem to want more productive farms and larger incomes. The first reason, therefore, for a productivity push in agriculture is the social fact that this sector is where the people are. If Bolivia is to achieve a strong and viable democratic society then programs must be designed to assist a large number of people.

Of course, the total problem is more complicated. The social goal of helping the majority of people to richer, fuller lives can be accomplished in many alternative ways. Since development resources in Bolivia are very scarce major attention must be given to efficient ways to bring growth about. This is a very difficult and complex problem. At the least, if agricultural investment is efficient in producing national economic progress, it must be shown that agricultural investment expenditures have high rates of return. Economic efficiency criteria must be given primary importance in investment decisions.

At the present time, it seems evident that vast quantities of human and land resources have few good alternative uses outside agriculture. The total development process could go forward so much more quickly and painlessly if a strong industrial sector could emerge in Bolivia. Almost every developed country had concurrent development in the agricultural and industrial sectors. This permitted good markets for efficiently produced food and fiber. It also provided a profitable opportunity for displaced agricultural labor, and permitted capital formation, induced by low agricultural prices, to become the source of investment funds to produce economic progress. There seems to be little doubt that the greatest impetus to agricultural development in Bolivia at the present time would be prosperous non-agricultural sectors. Strength from the demand side in the form of favorable prices nearly always effects increases in supply. The overall outlook for agriculture would be much brighter if strong demand forces from outside could be counted on for support.

It is difficult to foresee, however, a rapid rate of development in the industrial sector. Bolivia does not have the technical and developed energy resources to support it, although there are some encouraging signs in chemicals, mining, and petroleum. Promising possibilities exist in the processing of agricultural raw materials, such as textile manufactures, llama and alpaca wool processing and cloth production, and in wood products. Still, it would be a mistake at this juncture to believe that a vigorous industrial sector will arise to absorb easily excess agricultural labor and increase effective demand for agricultural products to the point where increased supplies can be sold at present price levels.

Agricultural development will have to be justified under the presumption that human resources will remain in agriculture, and that the agricultural sector itself must absorb much of the increases in agricultural production.

Assuming that investment in the agricultural sector can efficiently increase supply, will the demand forces, internal and external, be sufficiently strong to prevent catastrophic drops in prices and reduced farm incomes? If prices can stay above costs, even though they fall in absolute terms, then gains can be made by farm producers as well as by all consumers. It is quite likely that this will, in fact, occur.

Nutrition levels in Bolivia are low compared to neighboring countries like Argentina and Chile. It is not only that Bolivians eat almost a third less than Argentines that is most significant. Even more important to this argument is the type of calories that are consumed. A high proportion of the Bolivian population consumes mainly potatoes, barley, quinoa, bread, and some little meat. This diet requires a small amount of agricultural resources compared to a diet of the same caloric quantity consisting of heavy meat consumption, dairy and poultry products, and sugar. These commodities are consumed in smaller per capita quantities in Bolivia than in any Latin American country with the possible exception of Haiti.

As agricultural productivity improves and supplies increase several important demand considerations will come to bear. Prices should decline initially. Because of low nutrition levels and limited purchasing power, the price elasticity should be high for agricultural products in general, and especially for particular products like meat, dairy, poultry, and sugar. Lower prices should substantially enlarge the quantity demanded. In addition the demand curves for resource intensive agricultural products will shift upwards as the preferences of people for these foods increase. Real incomes will probably continue to rise in the economy as a whole. Income elasticities for meats, dairy, poultry, and sugar products likely are high. And perhaps most important of all, if it becomes technically and economically possible for the campesino to specialize his production and enter the market economy, the market value of his total agricultural consumption probably will increase. In addition, it is likely that his consumption will shift toward heavy resource using commodities such as livestock products.

On the matter of income, it is entirely possible that the COMBOFLA program of wool marketing alone can increase the money incomes of Altiplano families by about five million dollars a year. Much of this increase will be spent on agricultural commodities.

This evidence, admittedly most of it a priori, suggests that sizeable agricultural production increases can be absorbed by the Bolivian economy.

As productivity gains are achieved in agriculture and lower food prices result, those who benefit relatively the most will be those with lowest incomes who spend the largest percentage of their incomes for food. This will also be true of low income agricultural producers, who are also consumers, to the extent that they enter the market for food supplies.

In addition to this rather optimistic outlook for domestic consumption is the possibility of agricultural exports. Increased efficiency and lower prices will increase the attractiveness of exports. Bolivia's balance of payments position is sharply adverse and any relief brought about by agricultural exports would be welcome indeed.

There are some indications that in recent years there has been some saving by rural people. It is likely that this trend will be accelerated if agriculture becomes more efficient and incomes increase. The trick will be to get savings into investment channels. One alternative would be for the government to tax these savings and use the revenues for development purposes. A land tax is presently being considered for this purpose. Cooperative credit unions have been established where funds are put out for loan. However, these funds are used mostly for consumption loans. Production loans should be considered also.

It is possible to increase agricultural efficiency without reducing the agricultural labor force. Under present conditions this is probably desirable. Until alternative employment opportunities can be found for excess labor a good case can be made for capital saving rather than labor saving development. Many examples could be provided from advanced countries, however, of increased agricultural efficiency eventually being labor saving. This probably means urban migration and lower labor prices unless demand for labor simultaneously increases. It is likely that service industries can and will absorb more people under lower wage rates, and the effect on industrial development might be desirable. Urban unemployment and general income distribution problems will cause social stress, however, unless industrial expansion occurs concomitantly with agricultural development.

2. The Economic Productivity of Investment in Agriculture

Evidence now will be presented which supports the hypothesis of high productivity of agricultural investment. Most of it comes from the area of production. Secondary data are scarce so primary reliance is given to our own observations.

There seems to be considerable recent capital formation in agriculture. It is apparent that capital formation cannot take place if all products of inputs are consumed. In a poor economy, labor is used to produce both consumption goods and to improve the productive plant. Labor can thus be made more efficient in producing income by increasing the ratio of capital to labor. Examples are easy to cite: fences and terraces, storage facilities, animal sheds, small irrigation developments, and piling of rocks. Land fertility is being built up by rotation and fallow, which are methods of increasing future production often at the expense of current production.

More cash inputs are being purchased by farmers. Fertilizer use is increasing year by year although it is still almost miniscule. Agricultural machinery imports are holding up well after reaching a peak in 1956. Breeding livestock imports reached an all time high in 1963. These facts suggest a progressing agriculture where consumption is being voluntarily restricted in order to increase inputs and future production.

Although no data are available to reveal magnitudes, the rural campesinos are said to be hoarding cash balances beyond the needs of transactions. This reflects saving. In addition, in the rural areas one sees bicycles, transistor radios, and other gadgets that suggest wealth accumulation. It is reported that these items were not seen as recently as three years ago. Extension agents also report that rural families are acquiring furniture of simple types and other household semi-durables like kitchen ware. These signs are expected where per capita incomes are increasing. They also probably reflect increased participation of rural people in the market economy.

Agricultural credit also provides some interesting evidence of increasing agricultural incomes and high productivity of investment. The Agricultural Bank is making loans to farmers for operating and development purposes. The interest rate is fixed by law at 12%. On the Altiplano a very large percentage of loans have been and are being repaid. The repayment records over past years is poor, notably in the Santa Cruz and Tarija areas, although tighter banking practices and carefully supervised credit have remedied much of the trouble this past year.

If loans are carried at 12%, and repayment is on schedule, investment funds must be returning at least 12% to the borrower, unless he has to reduce consumption to repay the loan. In this case repayment difficulties are inevitable, sooner or later. No evidence for this was observed. Even under current careful loaning practices the Agricultural Bank has insufficient funds for loaning purposes. Demand greatly exceeds supply even at the "high" interest rate.

The Argentine Bolivian Bank, a commercial banking institution, has doubled its agricultural loans in the Santa Cruz area this past year. These are short term operating loans for one year's duration only. The rate of interest is also 12%. Only about 1.5% of the loans have run into payment difficulties and most of these are regarded as recoverable. The Bank is considering agricultural loans in the Altiplano and Valley areas as well as further loans in the Tropics. This indicates real confidence in the agricultural sector.

The conclusion seems to be that the marginal returns to investment loans in the agricultural sector are at least 12%, especially in small short-term operating loans where repayment has been excellent. It is possible that much higher returns are being earned on the average, since in addition to interest costs there are closing costs, and in some cases costs of paying delinquent taxes that must be cleared up before a loan can be approved. It may not be unreasonable to believe that loans may be earning 15-20% to the borrower. Of course, it is conjectural how long these high returns can continue to be made. But in a poor and technologically primitive agricultural economy, where technological advances seem to be just around the corner, the number of high yielding investment opportunities in agriculture could well increase in the decade ahead.

National production statistics strongly suggest a rapid rate of agricultural growth although the data are sometimes questionable, especially aggregate estimates of total agricultural production. The data that are available indicate that agricultural production increased by 11% in 1963. To cite a few of the important crops, rice production increased 300% between 1959 and 1963, sugar cane 240%, potatoes 42%, and corn 10%.

The money supply reportedly grew about 20% from December 1962 to December 1963. Retail prices are almost stable through the year but then rose in January 1964. Food prices declined slightly through 1963. With the increased money supply and relative stability of prices, either monetary velocity must have decreased or transactions must have increased. It has been suggested that cash hoarding has been reported but it seems unlikely that this could absorb a substantial portion of the increased money supply. Transactions must have increased. Perhaps greater numbers of consumers were participating in market activities. But it also seems probable that strong increases in production required increased transactions to move commodities to consumers. The industrial sector grew about 7% in 1963 and this undoubtedly accounted for some increased transactions. The industrial sector is rather small, however. It seems highly likely that increased agricultural transactions accounted for a large proportion. This conclusion is consistent with our other observations concerning growth in the agricultural sector.

In summary, it appears that the agricultural sector is experiencing considerable growth, that the Bolivian economy can absorb a great deal more growth, and that agricultural investment is earning high rates of return.

B. Criteria to Guide Investment Decisions

1. Developing and Utilizing Economic Criteria

The most important problem facing Bolivia at present time is to achieve a substantial rate of economic development. This has been much emphasized, both by the Bolivian Government and by many external agencies who are trying to assist in bringing growth about.

The country has made much progress in critical social areas such as agrarian reform, and her citizens not only own property but participate in democratic processes and institutions.

These are tremendous achievements. Bolivia's social and even political institutions now, however, are being held back by economic constraints. Government services are inadequate and public employees are underpaid. Many of Bolivia's best trained and able people have left the country to obtain more lucrative jobs. Economic development should now be given top priority. This will strengthen political and social institutions as well as bring better levels of living.

It is urgent that firm economic criteria be developed to guide development decisions and programs. This does not mean that social and political considerations will cease to be important. Decision makers must always consider all relevant factors that relate to a decision so that goals can be reached in the most expeditious and fruitful manner. But it is also true that economic considerations should be paramount in reaching economic goals, moderated with social and political forces which impinge on any given situation.

Even if political considerations dominate some situations and require a certain "uneconomic" decision to be made, it is important to know how much this decision costs in economic efficiency.

Essentially the economic decision criteria should consist of economic evaluation of investment alternatives and the choice of those projects which yield the greatest net economic gain. It would be helpful, of course, if a standard evaluation procedure could be used by all agencies involved in investment decisions. This would permit across the board comparisons of projects.

The evaluation procedures should be conceptually rigorous and yet easy enough to use so that evaluations can be quickly made. Many alternative procedures more or less meet these requirements; benefit-cost ratios, the "present value method" (calculation of the absolute difference between the present value of a returns stream generated by an investment proposal and the present value of the cost stream necessary to acquire it), the internal rate of return (that rate of discount which equates the present values of the returns and cost streams). All these involve estimating project life and discounting future benefits and costs; steps which are especially necessary in an economy where interest rates are high and capital is scarce.

While the present value method is free of some logical problems that the others have under some circumstances, it is often difficult to use in practice. An interest rate must be selected for discounting purposes. Even in a well developed economy like the United States, where interest rates are low and comparatively homogeneous, there is much argument about what is "the" relevant rate. This problem is many times greater in Bolivia where much less information is known about alternative investment yields.

For this reason the internal rate method might be the best one to use. This method yields an internal rate of return on each investment alternative which is considered and those projects are selected with the highest internal rates.

All of these evaluation methods assume that all relevant economic costs and returns can be identified and quantified and that the future can be predicted with certainty. There will always be great demand for people who can skillfully approach those unattainable assumptions.

On the other hand, conditions will sometimes prevent a thorough analysis of alternative courses of action. The sheer press of time to make decisions may not allow completion of the kind of analysis desired. At other times political exigencies might prevent pursuing the best economic course. And finally, it may be that data are so scarce or unreliable, and estimates of the future so tenuous, that intuitive judgments about alternatives are necessary. ^{1/} Still, careful analysis and rational attention to economic criteria should be meticulously followed when conditions do permit.

2. Some Implications of the Shortage of Capital

Capital resources are extremely scarce in Bolivia at the present time, even with the relatively large amounts of foreign assistance which are being given. Officials and technicians of the Bolivian Government, U.S. AID, and United Nations, as well as businessmen and farmers, have stated flatly that lack of funds was their major problem. Budgets for field operations in some ministries are so low that field work is very weak. Many marketing functions are performed with large quantities of labor and almost no capital. The list could be extended almost without limit.

^{1/} This is perhaps particularly true in comparing labor using versus labor saving investments and in infrastructure investments such as roads into new areas for development purposes.

A strong case can be made for adopting programs and policies which will stretch the limited capital as far as possible. The productivity of capital will be maximized where the ratio of land and labor to capital is highest, assuming the level of technology and general conditions of growth are given.

This assumption, however, is very important to take into account. In more technical terms, maximizing the internal rate of return approaches the optimum level of capital use on a given production function. As the level of technology changes the production function shifts. Certain kinds of development activities affect the level of technology more than others so maximum long run development is now always reached by moving to the optimum point along a given production function. Therefore, in addition to picking projects with high internal rates, the effect on technology must also be considered.

There is a high probability that capital resources are presently being misallocated as between working capital and development capital in agriculture. Working capital includes most cash operating expenses such as seed, fertilizer, insecticides, and some marketing costs, while development capital consists of such things as road building, land clearing, and irrigation development. Practically all working capital credit is available at 12% interest or more. Much development capital is available at 4% from BID loans. If it can be assumed that the value of these loans at the margin is at least equal to the loan rate, then the aggregate value of capital can be increased by shifting some funds from the four to the twelve percent loans.

Another part of this argument is that high discount rates greatly reduce the present value of lengthy returns streams generated by development projects compared to short returns streams generated by working capital. For example, if the discount rate is 12% and a perpetual stream is produced by the investment project, 76% of the total present value is captured in the first 10 years. If the rate were 20%, 72% of the returns would be captured in only five years. This means that investments which require heavy capital inputs and generate long returns flows come off poorly in present value comparisons with short term projects.

Let us now suggest some general types of projects where the returns to capital appear to be high.

Consider first the activities of the wool marketing board, COMBOFLA. Most of its capital is used to purchase llama and alpaca wool from campesinos. After the wool is sold in Liverpool, funds are available to repeat the process. Much more wool could be purchased from campesinos if more operating funds were available since only a small fraction of these animals are currently being shorn. And because the capital turns over so often, it is likely that more of it would have high marginal value.

Most capital expenditures which involve large quantities of labor and land with capital should turn out to be efficient under our criterion. Often the returns will be social as well as economic. Good examples are community development projects such as the building of schools, community services, and potable water supplies. The objective should be to provide small quantities of capital for items which the campesino cannot provide but which complements his labor and other capital contributions. Those expenditures should be made which will be fruitful in providing incentives for the rural people to undertake and complete projects. We applaud much of this work which is going forward and would like to see it have increased support.

Another fruitful use of capital funds is in the areas of agricultural research and extension. It has been shown that returns to these kinds of expenditures are extremely high in developed countries like the United States, where diminishing marginal returns easily could have been encountered by now. In Bolivia, the potentials for productivity increases related to technology and better management have hardly been touched. Animal and crop yields are very low, management techniques and tools are primitive, disease is prevalent, and very little fertilizer is being used. Very little capital outlay would be involved in better management, and gradual improvement of livestock breeds and crop varieties. However, relatively large capital expenditures would have to be made in research and demonstration centers to provide competent technicians and extension agents and to develop and disseminate information. It seems, however, that internal rates of return from these expenditures would be very large now, and will remain so for many years to come.

Fertilization, disease control, and better tools require initial outlays of cash, but the argument has already been made that this type of working capital probably has high yields.

Other kinds of development activities are relatively heavy capital users. It is especially important that these be brought under economic scrutiny. It is also important that resources be costed properly; i.e., that the opportunity cost concept be used. This is important in the case of labor as well as capital. Also, when people move from one area to another the social costs of the move must be evaluated and charged against the receiving project.

Colonization involves heavy capital cost if the land clearing is done with large equipment and road building is necessary. On the other hand, clearing can often be accomplished by hand labor that has low opportunity costs and the capital cost might be low as well.

There are other capital intensive developments taking place in Bolivian agriculture. The large complex at Todos Santos near Santa Cruz is a good example. Capital expensive livestock are being imported on a rather large scale and good facilities for their care are being erected. A slaughterhouse for hogs, large by Bolivian standards is being constructed. This is an impressive project and only time will tell what its contribution to the economy will be. Nevertheless, to be economically justified internal rates of return to projects of this kind should be just as high as those that compete for the scarce capital.

Large scale irrigation development and erosion and flood control programs are also costly in initial capital investment. Such proposals also should be thoroughly evaluated with respect to economic feasibility.

The important principle here is the one elaborated in the beginning of this section; namely, the importance of following sound economic criteria in making investment decisions when you are permitted to do so. The first prerequisite is the availability of competent technicians to make the feasibility studies. Alternative project proposals must be anticipated far enough in advance of investment commitments to permit studies to be made. Decision makers then must be as firm as possible in selecting those with the best prospective yields. After the investment die is cast, a good research and extension program will be required to bring the projects to successful fruition and completion.

C. Some General Observations on Area Investment Problems

A few prefatory observations of a general nature will now be given about the investment opportunities in the three major regions of the country, the Altiplano, the Valleys, and the Oriente. This is part of the general investment framework introduced here.

1. The Altiplano

By almost any standards, agriculture on the Altiplano is primitive. Crop and animal yields are low. Crude hand tools are used on small plots of land with usually only ox power to aid in tillage and harvesting tasks. Insufficient moisture and frost are almost always a threat to production.

Despite these harsh conditions imposed by nature, it appears that there are good opportunities for production increases. Experiment station trials indicate large returns from fertilizer use, water applications, better crop varieties, and animal improvement.

Increased use of legumes should be encouraged to increase nitrogen levels. Use of nitrogen fertilizers and when phosphorus is deficient, application of phosphate fertilizer will contribute to improved crop production. New plant varieties are being developed experimentally which will be capable of increasing yields as they are introduced. Livestock trials indicate that animal size and wool yields can be increased for llamas, alpacas, and sheep. All these productivity gains will be reasonably cheap in capital investment cost, and large numbers of rural people are potentially affected.

For the present it is important that per hectare yields be increased to prevent a large loss of Altiplano population. It is doubtful that larger urban population can be employed at current wage rates. Of course, if the industrial and service sectors can absorb excess farm population in the future so much the better. This will permit farm size expansion which is needed. The agrarian reform law could then be liberalized to permit larger land holdings.

In addition, the new colonies in the lowlands will provide opportunities for resettlement of Altiplano people. How much migration there will be in the future is conjectural. With high rates of population growth, however, perhaps the most that might be expected is that the Altiplano population will remain at about present levels. If this is so, then increased incomes can only come from increased yields.

Altiplano ranges probably have been overgrazed for centuries. Palatable grass species are very sparse. It is likely that reducing livestock herds will not greatly increase forage yields, especially of good grass species, although further deterioration might be prevented. On the other hand, range revegetation is costly, especially where climatic conditions make it difficult to establish a new stand. A study should be made of the most economic ways to increase range productivity.

Small irrigation development should also give good returns over costs in some areas of the Altiplano. Small diversion fixtures and ditches can be constructed without heavy capital costs, and even wells can be economic if

water table levels are near the ground surface. However, if pumping occurs to any great extent it will be necessary to have a study made of ground water basins to determine the size of the aquifer, rates of replenishment and the water quality at different depths. It is easy to get overinvestment and social waste if water levels decline below economic pumping levels.

2. The Valleys

It appears that economic and social problems in the Valley areas are even more serious than on the Altiplano, and will be more costly to solve.

The farm population is more dense and farms are smaller than in other areas of the country. It is even more critical that farm size increase, since the Agrarian Reform Law established very small farms in this area. Sometimes land ownership in one farm is badly fragmented. Special efforts should be made to recruit colonists from the Valley areas to alleviate this farm size problem as much as possible.

Irrigation is practiced more widely in the Valleys than in other parts of the country and the returns from water application appear to be high. Small irrigation development should be encouraged whenever it is economic. Drainage is an important component of irrigation, however, that has been neglected.

Thousands of hectares are presently going out of production or are being severely restricted in productivity due to accumulation of salts because of poor drainage. Obviously this a great waste of resources and is expensive in capital cost to remedy. Much thought and planning must be given to drainage problems at the time of irrigation development and must be part of the economic calculus.

The overgrazing situation is very serious in the southern mountains of the Valley areas where soils are beginning to erode. If the large goat herds in this area are not greatly reduced the resource base will be lost or badly depleted.

The imperiled ranges are owned by communities of campesinos who were given legal ownership under the Agrarian Reform Law. Under this common property ownership arrangement, all the individual incentives lie in the direction of increasing goat herds. Campesino A will increase his own herd if he can, because if his goats do not get the available vegetation, Campesino B's will. It will take some severe regulatory policy by the government or some other agency with the requisite power to correct this situation.

Erosion problems are already very serious in some parts of the Valleys, especially in the Tarija area. Opinions differ as to the reasons for erosion in the Tarija Valley, the length of time it has been going on, and what ought to be done about it. It is of critical importance that the complete gamut of overgrazing and erosion problems be thoroughly studied in order to determine the best course of action. This must be done soon because erosion is very costly to reverse when it goes as far as it has in the Tarija area. In fact, it seems that perhaps the best course available now is to choose the most valuable land parcels which are as yet comparatively unaffected and try to prevent them from being lost. It would be prohibitively costly to restore areas already badly eroded and perhaps even to arrest what presently is being lost.

On the other hand, the Valleys area has much to contribute. It is located in the center of the country and reasonably good roads reach out to the largest cities of the country surrounding it. And perhaps most important from the standpoint of growth, many of the agricultural commodities which are presently being imported can be grown here; wheat, hogs, lard, milk and some of the oil crops. Programs to stimulate production of these commodities will have a buoyant impact on the agriculture of the area.

3. The Oriente

There are such a multiplicity of conditions and problems in the Oriente that it is difficult to sensibly discuss the region as a unit.

Nature is less niggardly in this warmer and lower area. Subsistence agriculture seems to require less human effort. It is far easier in this region to transform human labor into fruitful agricultural production and build up capital assets.

Certain kinds of problems can be expected, however. There is ample evidence from other countries that tropical soils are easily depleted and yields decline after very impressive beginnings. Fertilization is required to maintain productivity. One of the real tough problems in determining project feasibility in this area will be to assess future declines in yields or costs of maintaining fertility. It is probable that studies from other tropical countries will help to some extent, but it is highly important that research on this problem be carried out in Bolivia as well.

It is also difficult to predict in advance the cost of insects and disease in tropical areas. Human beings, livestock, and crops are affected. It seems reasonable to believe that these costs might be understated in economic calculations because of lack of predictive information.

The transport and marketing costs also are high where production areas are located so far from areas of consumption. These costs also must be carefully determined and imputed against projects in the production areas.

On the plus side, there seems to be some very promising possibilities for exporting Bolivian agricultural products, especially tropical fruits, to neighboring countries. These are grown in the Oriente and the Yungas. Food exports may be much more efficient in generating foreign exchange than a subsidized mining sector.

The expansion of cattle production in the Beni needs careful evaluation. Rather large investments in land clearing, water control, and in the establishment of improved pastures will be required. Research, education, and services are needed in control of animal parasites and diseases and in developing a balanced nutrition program for livestock throughout the year. Markets are distant and transportation is difficult and expensive. Future possibilities may include production of feeder stock in the lower Beni with finishing in or supplemental feeds from the Alto Beni or the Santa Cruz area.

In summary, we do not suggest that tropical agriculture should receive lower investment priority than that in the Altiplano and Valleys. Each investment proposal must be evaluated on its own merits insofar as possible regardless

of where it is located. Still, unfortunately, not even this prescription is correct. So many ancillary services are also part of each investment alternative. For example, it is foolish to consider an agricultural investment alternative in the tropics in isolation of transport and marketing considerations. The produce must be transported and marketed so roads and marketing services must be provided. All these must be incorporated in the economic justification of the project insofar as possible and this is never an easy task.

D. The Importance of a National View

A few general remarks will now be made concerning coordination of all agricultural programs and policies at the national level.

Many agricultural programs in one area of the country impinge on other agricultural producers as well as consumers in other parts of the country. For example, large increases in the production of corn in the tropics may have a severe income impact on the farmers in the Valleys. It may be argued, of course, that competition should take place between regions to be sure that the law of comparative advantage really works and there is merit in this argument. But it is also true that some coordination at the national level to determine production priorities for given areas is also wise policy. In this way costly duplications in equipment, machinery, research and extension services, and transport services can be reduced. A national view is also necessary in order that income distribution considerations can be given proper attention in case they conflict with efficiency considerations. The final criterion should always be to determine if given programs are good for the country as a whole.

National coordination and planning is also necessary because almost all agricultural investments affect other parties besides those directly involved in the investment contract. This is the same thing as saying there is often a disparity between private and social costs and benefits. Erosion control often gives benefits to downstream water users, soil leaching imposes costs on downstream water users, disease control on cattle in the Beni imposes costs on cattle producers in the Valleys, etc. Often these things are subtle and very difficult to quantify. It is still important, however, that these considerations be investigated and be given appropriate weight in the decision framework.

SECTION II

PRESENT STATUS AND POTENTIAL OF AGRICULTURE IN BOLIVIA

Bolivia is an agricultural country. Two-thirds of the population are engaged in agriculture and produce about 1/3 of the gross domestic product. Agricultural exports however are negligible while agricultural imports amount to over 25% of total imports. For the first half of 1962 recorded imports of food and beverages amounted to \$10.3 million with exports of \$2.5 million. Major food imports are edible fat and oils amounting to \$2 - 2.5 million, about 90 percent of the national consumption, and wheat flour amounting to \$6 million or more - 75% or more of the national consumption. In addition Bolivia imports \$1.4 million of fibers a year, \$.4 million of cotton, \$.3 million of wool, \$.7 million of jute, plus manufactured textiles.

Technically each of these products can be produced in Bolivia. Potential contribution to domestic farm and industrial income and a saving in foreign exchange is about \$10 million at current consumption levels for these products.

Bolivian agriculture is comprised of two sectors, the overpopulated temperate uplands and the underpopulated tropical Yungas and lowlands. Both areas are labor intensive and capital poor with primitive methods of planting and harvesting and with very little agricultural machinery or other cash cost inputs.

Bolivian agricultural production areas and institutions have been adequately described in the U.S. D.A., Agricultural Team reports of 1962 and 1963. ^{1/} Production estimates are available in U.S.D.A. "Indices of Agricultural Production for the 20 Latin American Countries".

In terms of available labor and land and the adaptability of crops and livestock Bolivia has a tremendous agricultural potential that needs capital and technology for development.

The problem of agricultural development in many underdeveloped countries is that of maintaining adequate supplies of cheap food to keep industrial costs low during a period of more or less rapid industrialization. At the same time farmers must be encouraged to stay on the land at relatively low levels of output and low prices while demand for industrial labor improves because even poor levels of industrial salaries tend to attract labor from subsistence level farms.

In Bolivia there are certain differences. The Agrarian Reform freeing the campesino from the need to support landlords has provided him a margin of production above the minimum consumption level and has permitted him to join the market economy. This margin is reaching the mark in spite of continued pressure of population on land in traditional areas. Colonization of tropical

^{1/} "Bolivian Agriculture, Its Problems, Programs, Priorities and Possibilities" and "An Agricultural Production Program for Bolivia".

low lands has begun to relieve some of the pressure on land and in addition is greatly increasing the productivity of the campesinos who have moved.

Thus Bolivian agricultural production has made sufficient gains in recent years to increase per capita consumption while helping to maintain relative stability in the overall level of prices. Real wages reportedly increased 20% between 1959 and 1963. Cost of living increases have decreased each year from 12% level in 1958 to little or no change in 1963.

The problem then is to continue to keep Bolivian agriculture prosperous and productive while increasing effective demand through higher incomes, lower prices and at the same time the increasing proportion of labor in the non agricultural sector.

Agricultural contribution to increasing demand will be through:

1. Industrialization of agricultural products.
2. Increasing the service sector through greater specialization in agriculture and a separation of production and marketing functions.
3. Increase in non agricultural goods and services for consumption in the agricultural sector.

A. Production

The first impact of investment may be expected to challenge the areas in which Bolivia is not self sufficient, where markets already exist. The high transportation costs involved in importing and exporting give additional value to meeting internal needs first. The similarity of production of nearby countries limits the possibility for export crops. Best potential for exports exists (1) in areas immediately adjacent where transportation costs are low or (2) for high value crops where transport is a small part of total value.

It is estimated that Bolivia could meet its present consumption of cotton from 4,200 additional hectares, its present consumption of vegetable oils from an additional 4,000 hectares of peanuts or similar crops; imports of lard could be covered by 180,000 hogs using 18,000 hectares of corn; and that 1,000 hectares of jute would cover present imports. Current levels of wool production would meet local needs if quality improvements now underway succeed. Imports of dairy products would be covered by 3,000 hectares of pasture and forage. Wheat imports would need 180,000 hectares of land to replace which would have to come from substitute crops or from tropical wheat areas. This indicates a potential need of 281,000 hectares of new production at present levels of consumption and yields or somewhat less than this if some production were to come from increasing yields. We do not anticipate, however, that Bolivia will be able to replace total wheat imports from domestic production.

Population is growing at the rate of about 2.5% a year. Technological improvements in production should readily cover the additional food needs from this cause and could even contribute to increasing levels of consumption. The current low levels of calorie intake and protein and fat intake indicate that potentially substantial increases in consumption could take place if incomes were sufficient for purchase.

Because most consumers are also food producers, production, income and consumption are to a considerable extent interdependent. This together with the fact that incomes in the non agricultural sector are double those in the agricultural sector points out that the most important effect of income on increasing consumption will take place in the non agricultural sector. Industrialization and specialization in production can be expected over time to increase the marketing function and increase the proportion of the population in the non agricultural sector. This will also have a beneficial internal effect on the agricultural sector, if for instance, it permits more oranges to be exchanged for more milk.

1. Changing Technology

The recent slow rate of development in the non agricultural sector points to a relatively slow increase in demand for agricultural products. A rapid increase in agricultural technology therefore would run the risk of oversupplying the market at current demand. While rapid increases in technology could reduce costs and increase production this could have an uneven effect on producers since a few would benefit from reduced costs and prices while many less able to adapt themselves to the new technology, would suffer loss of income. Where the agricultural sector is so large this could have a deleterious effect on the whole sector and whole economy. Heavy investment of capital and technology would help the efficient producer to increase production and reduce prices to the detriment of the vast bulk of producers. Investment in raising the personal capacity of producers will give longer run benefits to the economy and society. We must not run the risk of forcing farmers off the land faster than the urban economy can absorb them.

The Team therefore does not see any radical change in methods of production within the next few years. Increasing amounts of machinery, tools, fertilizer, insecticides, etc., will be used throughout the agricultural economy. For the most part high relative cost, capital shortages and the small size of most productive units will slow technological changes. Tractor hire will be more advantageous than the use of oxen for many campesinos and it is probable that the increase in tractors will be owned by cooperatives more than by individual campesinos.

Capital accumulation and investment can result however from labor inputs at very low alternative costs. Thus land is cleared of rocks or trees, fences and terraces are built at great cost in labor but little or no cash cost and thus labor is capitalized into income producing assets. As long as alternative returns from labor are low and such investment pays for itself agriculture can continue to capitalize itself at little cost to the rest of the economy. This is investment in a true sense. In fact under adequate technical direction and with small cash capital inputs agriculture could capitalize itself at considerably greater rate, for instance with small irrigation projects, sheep dips, fencing, silos.

One problem with capital development is that inputs are frequently in terms of large blocks of capital which must be compared with the same amount spent on a number of smaller inputs. Will the block investment of several million dollars in a single road or factory be as effective as the same amount of money spread over the whole sector? Because the supply of investment comes in blocks and because the feasibility of block inputs is easier to justify, development will go on this way, sometimes causing dislocations in the economy that the private sector may take time to catch up with.

2. Persistence of the Subsistence Sector of Agriculture

In projection economic development for agriculture it may be useful to probe certain areas of potential development as to their contributions to economic growth. Although Bolivia has abundant land resources, the present high ratio of labor to land and capital leaves most of Bolivia's producers at a subsistence level with very little marketable surplus. While increased capital could conceivably double production on these units, the overall income effects might be relatively small due to declines in prices that would be necessary to absorb increased production.

Technology and capital will ordinarily give better returns where the land labor ratio is more favorable. This will widen any existing discrepancy between incomes due to land availability. The input of capital and technology can be expected to produce better profits on larger holdings, at least up to a point well above the average size of holdings in most areas. This suggests that as a commercial farming technology advances in Bolivia the problem of subsistence farming will continue to hold the mass of campesinos well below the average income level of the country.

While it is difficult to conceive of a population 70% engaged in agriculture which cannot feed and clothe itself, it becomes equally difficult to conceive of a productive agricultural economy with 70% engaged in agriculture being able by itself to consume all it produces. For instance New Zealand, a highly productive agriculturally based country, has only about 17% of its labor force in agriculture. The production gap in Bolivian agriculture in reality is narrow. Agriculture is not likely to become a base for significant economic development unless production enters the export market and unless there is a significant decline in the proportion of population engaged in agriculture.

Assuming an increase in urban population and employment of 10% a year it would take 10 years to reverse the present rural urban proportion. Recorded non agricultural employment, however, showed practically no change from 1959 to 1962.

Along with population increase, per capita income increases, price decreases and a changing rural-urban ratio, average output per person engaged in agriculture conceivably could quadruple in the next 15 or 20 years. While this in itself might be extremely significant, it would probably come about through increasing production per person perhaps 10 times on a fifth of the farms and a possible doubling production on the remainder. The problem of subsistence farming will not be readily solved.

Movement of campesinos to colonization areas cannot advance fast enough to cure this problem because a) capital is not available in sufficient quantities, b) it would not be sufficiently productive in terms of the technical ability of the campesinos to use it. In fact greatly increasing the rate of colonization could increase the problem because of greater productivity in the tropics.

The apparent persistence of the subsistence sector of agriculture indicates that money spent in agricultural development will generally be more valuable when it affects both the demand and supply side than when it affects only the supply side. Capital going into agriculture will have the greatest long run effect on demand:

1. Where it increases the non agricultural sector through marketing, industrialization, etc.
2. Where it increases the export sector.
3. Where it decreases the import sector (within the same cost price boundaries).

As has been said Bolivian agriculture is generally healthy enough to keep up with increasing demand from population and income growth. Land and labor resources are sufficient to more than supply present demand. Additional capital in agricultural production can increase pressure on areas of high labor to land ratios. The need to reduce the proportion of the population active in agriculture is obvious. The need to exploit agricultural resources to benefit the foreign exchange position and to supply better jobs in and outside agriculture are additional elements in development.

3. Colonization

The preceding analysis indicates that colonization should succeed in 1) decreasing agriculture imports, 2) increasing agriculture exports, 3) providing more jobs in the non agricultural sector, 4) providing a better man/land ratio in established areas.

Much of this has been accomplished and has made a major contribution to the Bolivian economy. If carried beyond these points, however, colonization may result in excess production which will depress agricultural prices and thus decreasing agriculture income in established areas. For this reason colonization should proceed with close attention to the marketing of its products and the effect this will have on the existing economy as well as on the colony.

Colonization of the lowlands has been looked upon as a solution to the overpopulation of the Valleys and the Altiplano. The Bolivian 10-year plan projects a movement of about 400,000 persons from the Valleys to the lowlands in the decade 1962-1971. This represents a movement of about 10% of the population. It is expected to decrease population in the Valleys slightly while more than doubling population of the lowlands.

A great deal of money has already been spent on roads and colonization and a great deal more will be spent in this effort. Up to the present colonies have not been well planned, they have not been placed on the best land, production and marketing problems have not been foreseen; production has not always been related to national needs; and as a consequence settlers have not made as rapid progress as they should. The willingness of a variety of agencies to become involved in colonization experiments while ignoring basic principles of colonization planning and failing to benefit from previous experience has wasted capital and human resources. The future effect of continued poor planning will be much more significant than in the past when Bolivia's production gap was fairly wide.

There is much to be gained by a consolidation of all colonization efforts in one agency. Such an agency should plan colonies using technical assistance available in the Ministry of Agriculture. Planning should relate to crops that can be economically grown and that will contribute to the national need. Production that will contribute to surpluses will not help the new settlers, the existing producer nor the national economy. See recommendation 8, Page 52, Section IV.

Production for production's sake does not appeal to anyone. The high land campesino has already adjusted his inputs to a balance of production and leisure. By the abundance of land and the more favorable climatic conditions campesino labor will be much more productive in the lowlands. Therefore, colonization will contribute substantially to the national product. Unless this raises the campesino above the subsistence level and integrates him into the marketing process it is a questionable investment. The tropic campesino is currently producing more than he can market and is encouraged not only to shift his production but to decrease his product and increase his leisure.

The current danger in colonization efforts is that through tremendous capital inputs a new subsistence level of agriculture will be established at a lower level of labor input. The same amount of capital spent in overpopulated areas as is being put into colonization, while not as productive in terms of output, could perhaps increase income to a greater degree.

4. Irrigation

Three large irrigation projects are in the development stage but none is complete. The Villa Montes project has absorbed large amounts of capital and requires much more if it is to be productive. The market potential of this area is very questionable. Although the feasibility of further investment has been established, the money might be more productively spent in other ways. Completion of the drainage portion of the Angostura project in the Cochabamba area is necessary to prevent further deterioration of existing land through salinity. If nothing is done in the Cochabamba Valley the income problem will become more serious. The improvement of production and income of established farms may be a less risky investment than the establishment of new farms in a marginal area.

For the present, greater and more immediate returns on capital investment are promised through small irrigation projects where campesinos contribute labor and materials. The benefits of this type of development are more widespread and there is not the delay in benefits after investment that is the case with large investments and long term construction required in large irrigation projects. (Bolivia is littered with investments that only slowly or perhaps never will repay the costs). Similarly, involvement of the campesino in productive investment in his own neighborhood is much more satisfying experience than to transport him to unfamiliar circumstances far from his home. See recommendation

5. Credit

The reorganized Banco Agricola has not had sufficient repayment experience to pass judgment on repayment abilities under new management procedures. It is expected, however, that experience will be considerably better than under the old Banco Agricola and Supervised Credit.

Management of loan funds for Colonization and Rural Development programs will increase the Banks loaning abilities and work load but will not provide adequate credit for all justified areas of need. It is recommended that more loan money be acquired from AID, BID (or other possible sources) for loan funds, particularly small loans.

The cost of administering supervised credit on small loans is often greater than the interest earned at 12% per annum. On the other hand, small loans have the best repayment experience under the old program indicating that capital is probably very productive in this area. The social benefits from helping the mass of campesinos to introduce new practices and raise their level of output and living are evident.

The question resolves itself into the following choices - (1) increase interest rates on small loans to cover the added costs; (2) subsidize small loans through earnings on large loans, restricting the number of small loans to those that can be carried from bank earnings; and (3) make money available from exterior sources (outside the banks earnings) to subsidize extra costs on small loans.

The Team prefers the last solution and recommends that the Government of Bolivia or AID subsidize the Banco Agricola to permit more small loans to be made and collected. We believe it to be important that the subsidy be used to make more collectable loans and not to cover the costs of a larger number of bad loans.

The terms of the Banco Agricola reorganization specified that AID provide three supervisors to launch the Bank operations. AID has not carried out this provision completely. The USDA has capabilities in this field and could perhaps carry out this function for AID bolivia and the Banco Agricola.

In addition to the emphasis on small loans by the Banco Agricola there is room for work in mobilizing cash balances in campesino hands and committing them to fuller use. This could be done by the formation of credit unions or by production credit associations.

6. Fertilizer

Experimental data and experience show that good yield increases can be obtained from the use of fertilizer in practically all regions of the country. Yield differentials are particularly great under irrigation or in tropic areas where organic fertility has been used up through continuous cultivation. Without fertilizer, fertility of tropic soils is difficult to maintain under cultivation.

The Bolivian Government reportedly has underway a study of the feasibility of construction of a fertilizer plant. To develop a large market for fertilizer in Bolivia will require considerably lower fertilizer prices and a whole new schedule of yields, production costs and product prices will result, with probable changes in intercrop competition.

The team recommends that if construction of a fertilizer plant is not feasible at this time the Government institute programs to encourage the use and develop markets for fertilizer by reducing distribution costs and prices of fertilizers and encouraging their import.

B. Marketing

In the pre-revolution period market surplus per person engaged in agriculture was small. The surplus practically all accrued to the hacienda owner and moved to market rather readily. The small producer, or free campesino produced very little for the market because the market system was not set up to benefit him but rather exploited him.

After the revolution this market system largely collapsed as the campesino who took over the land increased his consumption and also cut back his production because the market offered him little incentive. Although the market system has gradually evolved to include the campesino its organization is still primitive. The system is characterized by low unit volume, distance, difficult transportation and the large amount of individual time spent in the marketing process.

1. Reducing Marketing Costs

Distance and difficult transport produce the major costs in marketing since the campesinos' time is relatively valueless. The fantastic amount of time spent in marketing small volumes of competitive product would be a valuable asset if it could be otherwise invested in productive enterprises. As production efficiency increases the campesino should find this time more valuable in the production enterprise than in marketing his own produce. At the same time he will increase the opportunity for the trader thus contributing to a larger service sector in the rural economy. A relatively efficient and trustworthy marketing class is needed to fulfill the marketing function at less alternative cost to the producer.

Transportation costs are effective barriers to marketing of surplus produce from distant production areas. When supplies are sufficient in major markets prices may be no more than transportation costs from distant markets. Surplus production, therefore, remains in production areas and forces down local prices. Under these circumstances production tends to adjust to amounts that can be marketed at reasonable prices leaving unused land and labor resources.

Reduction in production costs will work to the detriment of those far from the market and favor those producers close to the market (to the extent that elasticity of demand permits product to be marketed above costs of production). On the other hand changes in transport costs will benefit those far from the market more than those close to it. A better diffusion of income will result from decreasing transport costs than from decreasing production costs. Decreased transport costs will bring more suppliers into the market, lower prices to consumer, thus increasing demand and consumption. Perhaps investments in market roads, decreased capital and operating costs of trucks, increased competition among truckers, and removal of illegal tax barriers on road transport will do more than production technology to reduce consumer prices and to increase demand. Fortunately, both reduced costs of production and transportation are at work keeping some measure of balance between costs of distant and nearby producers. In addition the nearby producer often has the ability to shift production to take advantage of his nearness to market.

2. Market Information

Within a market the large numbers of buyers and sellers make for reasonable competition. Distance, lack of communication and small unit volume, however, tend to make market response to demand sluggish. The ability of market surpluses to move from one area to another depends on transportation costs, knowledge of current prices and risk of future prices. Lack of knowledge puts the campesino at considerable disadvantage in selling to the trucker-buyer. The risk factor makes competition from other buyers minimal.

Greater market knowledge of both supplies and prices would permit campesinos to receive higher prices by increasing their competitive position; it would also reduce risk and permit more competition among buyers. In other words, it would permit and encourage more entrepreneurs to capture price differentials between markets thus to increase the value of marketing function and decrease spreads between markets.

It should tend to increase the number of middlemen, increase campesino prices and decrease consumer prices; in other words capture value that is now wasted through oversupply in some markets and undersupply in others. This is a justification for increasing market and production information.

The Team recommends providing market news information on major agricultural products in major markets by radio. This should be timed to be the most value for the main market days.

3. Institutional Farms

The slowness of the market to react to demand and the difficulty of supplying large volume have encouraged the Army, COMIBOL, and other institutions to engage in agricultural production.

With 70% of the population in agriculture the market for agricultural products is largely among the 30% in the non agricultural sector. Competition from the Army and COMIBOL limit this market further when the agricultural economy should benefit from their purchases. The success of Bolivian agriculture will depend on the development of a commercial agricultural sector and marketing sector capable of specializing to some degree, providing adequate volume and quality and receiving adequate income.

For this reason it is recommended that the agricultural production of government enterprises be phased out and that food supplies be purchased on the open market or by contract.

4. Market and Price Regulations

The Bolivian market for imported products is protected by high transportation charges. In moving from a deficit position to a surplus position prices can fall from a level of world price plus freight to that of world price minus freight. This is a substantial drop in price which in the case of rice took place very rapidly. It can be reasoned that without external interference the market would make this adjustment only at the point in time when the economy shifts from deficit to surplus. This period can be stretched out only by a gradual increase of production through the transition period. If, however, production costs are below selling prices then producers have considerable incentive to increase production rapidly during the deficit period but are unable to make a rapid adjustment at the equilibrium point. Therefore, a period of market and producer demoralization follows until a balance of production costs and prices can be established.

It would appear that a degree of government intervention during this adjustment period would be warranted. As nearly as possible prices should be established at the equilibrium level that would balance production and consumption. The government should be prepared to purchase crops, store for the following year and, if necessary, adjust prices to the level necessary to sustain production at the level of national needs without subsidy.

Although lower prices will stimulate consumption, market friction and uncertainty will delay immediate adjustment to the new price-supply level. Consumers may require time to educate their tastes and may not adopt the new level of consumption until they are sure it can be maintained at this level. This would lead to a depressed price as the equilibrium point is passed followed by a gradual strengthening of prices at the same level of production. See recommendation 6, Page 52, Section IV.

5. Cooperatives

Development of marketing and other crops has been unsatisfactory largely because of the desire for quick results without proper preparation of the people in the basic concepts and operations of coops. The failure of most of the early coops has complicated the education job and further jeopardizes future success. The success of coops depends on a favorable attitude of rural people toward institutions. The Team therefore recommends that the coop program be closely associated with rural development and community organization programs and be administered by a Division of Agricultural Cooperatives within the Ministry of Rural Development. Such an affiliation of the coop program would be in preference to the rather sophisticated USAID assistance through U.S. cooperative institutions. On the other hand, in those instances where coops are found to have distinctive advantages, strong government support and even technical assistance should be given in developing an effective organization and efficient operational procedures.

6. The Southeast

Bolivia's southeast has most to gain by its nearness to the Argentina market and Argentina ports. Since Bolivia gives every promise of becoming a surplus and therefore export producer of agricultural crops the most favorably situated area for export is the southeast, both because it is farther from Bolivian population concentrations and because it is nearer to the easier and potentially cheaper export routes to northern Argentina and through the Paraguay river to the Atlantic.

Development of the Bolivian southeast will be fostered by improving rail transport through Tarija and Villa Montes by increasing rail traffic and decreasing rail rates. A two way movement will be desirable and probably as U.S. P.L. 480 flour shipments to Bolivia decline Bolivia will find it commercially desirable to import Argentina wheat and or flour. This should help to restore profitability to interior flour milling in the Potosi area and to help to restore the market for domestic wheat in these areas.

Agricultural development of the southeast will improve as Argentina markets are developed. Cotton production at Villa Montes, if feasible, will help to increase overall production and income in the area.

7. Labor Efficiency

In Bolivia there is much need for increasing efficiency, yet the efficiency of the firm may impose economic costs against society in caring for unemployed, providing alternative employment, or simply in wasted manpower. There is a serious question in all developing economies for which there is no easy answer. New industries often adopt labor saving devices not simply because they are more economical than cheap labor but for secondary reasons such as the lack of trained labor, risks of labor problems, projected future higher labor costs, inbred prejudices of the designer and so on.

While these reasons may be valid the reasons on the opposite scale are not always so obvious and their impact is more often on society than on the individual firm or even government enterprise. This is to exhort project planners to examine the wider aspects in making their decisions. For instance, the multiplier effect of money spent on wages is greater than for the average of non-wage items because of the more rapid rate of recirculation of wages compared to non-wage expenditures. This also suggests that shortage of working capital can be more serious than shortage of investment capital in a developing economy.

C. Commodity Comments

1. Fibers

During the pre-stabilization period Bolivia carried on a strong export business in textiles based on imported raw cotton and wool. Profitability was based on differentials in exchange rates between exports and imports. After the establishment of a unified exchange rate in 1958 exports were no longer economical and production was cut back substantially. The industry is reported to be technically competent but the physical plant currently is not modern enough to compete in foreign markets.

Wool

The Bolivian woolen manufacturing industry continues to operate on imported wools. The substantial production of domestic wool does not meet mill production standards and is used almost entirely in the production of homespun cloth.

Current efforts of the Wool Marketing Board, COMBOFLA and the Agricultural Servicio, SAI to improve the wool quality of domestic sheep should result in substantially higher quality wool that should substitute for wool imports within a period of very few years. Present programs in sheep and wool production should be continued.

The domestic mills should be encouraged to foster the uses of domestic wools. The lower prices for domestic wools should permit the domestic mills to better compete against imported woollens and probably to have some cost advantage in markets adjacent to Bolivia. In addition Bolivia should develop an export market for sheep's wool and improving quality will improve prices to growers.

The current program of COMBOFLA in wool marketing is a substantial contributor to campesino income in the Altiplano region and provides the economic base and incentive for a substantial improvement in agricultural production, in levels of living, and in community development. This program should be the number one priority in this region and should receive whatever loans are necessary to finance increased wool marketing. The monopoly character of COMBOFLA should be continued at least for some years.

The Team has confidence in the management of COMBOFLA and the direction in which COMBOFLA is proceeding. An American technical Advisor experienced in management and operation of a wool processing plant is needed to help COMBOFLA in the domestic manufacture of local raw wool supplies.

The ability of some industrialization to further increase national income from wool poses the problem of private or public investment and profit. The monopoly character of COMBOFLA and the degree of profit to be achieved from "tops" making poses a pricing problem if private enterprise were to intervene in the marketing system. It is proposed here that an industrial division of COMBOFLA be instituted with some of the profit from manufacturing accruing to a special fund for industrialization of agricultural products.

Demand and price for llama and alpaca wool would be improved if supplies of uniform high quality were available. In addition to the contributions of better nutrition and management of the animals to yield and quality of wool there also appears to be distinctive possibilities from a selection and breeding program. Evidence indicates wide ranges in fineness, length and yield of wool between animals within species. There may also be possibilities of species crosses such as between llama and alpaca or between alpaca and vicuña, however, the most certain and immediate beneficial results are likely to come from improvements within species. A beginning of a program of selection breeding and improved nutrition of these animals is being made by SAI at the Belén and Patacamaya experiment stations. Efforts along these lines should be increased.

The Team has examined the potential demand for llama and alpaca wools in relation to the potential supply in Bolivia. Bolivia is estimated to have about 280,000 alpacas compared with about 3 million head in Peru so that the full exploitation and even increase in Bolivian alpaca wool will not greatly increase the total world supply. On the other hand Bolivia has a potential supply of about 5.5 million pounds of llama wool compared with about 1.1 million pounds of alpaca wool. If this is all marketed it will substantially increase the supply of a closely competitive item.

The efforts of COMBOFLA to supply adequate quantities of closely graded llama and alpaca wools are increasing the market and demand for these products. Currently the entire production is marketed through the Liverpool, England auction. Requests for supplies have come from U.S.A., Japan and a number of European countries. Since the supply of llama and alpaca are a small part of the total world supply of wool and since they are a quality product with prestige value, it is anticipated that the market for these wools can easily double without particularly affecting the price.

Cotton

Production of cotton in Santa Cruz is reportedly of good quality and low cost and amounts to only about 1/3 of current domestic uses. This indicates that Bolivia is in a potential position to replace current imports of raw cotton. Cotton production at present is an integrated enterprise including production, ginning and manufacture.

It is recommended that additional production be established on a campesino level. This poses a marketing and industrialization problem since the Algodonera Company will not purchase outside production. Establishment of a cotton gin and market relations with other cotton users in La Paz must be established. Technical supervision to assure quality of production and ginning is essential. If private enterprise cannot be encouraged to develop this industry CEF perhaps will be able to provide ginning facilities.

Jute

Bolivia import annually about \$700,000 worth of jute bags. Since jute and similar fibers can be produced domestically this suggests an area for potential savings of foreign exchange as well as contributing to industrialization and agricultural production. The financial feasibility of establishing a plant for this capacity should be investigated. It is recommended that the USAID give consideration to such a feasibility study.

2. Fats and Oils

Establishment of an oilseed mill in the Santa Cruz area should have the highest priority. It would appear feasible to push the production of oilseeds until the national needs are met. The economics of this will become more apparent after the projected oil mill is established. As the economics of oilseed production are determined additional mills will be needed. Experimental work to produce the most economical oilseeds will need to continue.

Todos Santos, slaughter plant, promises to contribute substantially to domestic needs for lard, if hog production can be expanded. As the economics of lard production becomes apparent and as capacity of Todos Santos becomes inadequate, the need for additional plants in other areas should be examined.

3. Livestock Products

While meat prices are low compared to the U.S. they are still high relative to food prices and incomes in Bolivia. Consumption per capita is quite low. Increasing incomes and decreasing prices should contribute to increased per capita consumption.

Pork

In Bolivia pork prices are high relative to beef prices while in the U.S. pork prices are much lower than beef. This leads to the hypothesis that hog production in this country may be in a position to make greater cost reductions than beef.

Apparent problems in pork production are:

1. Low level of feeding - hogs are generally scavengers and are not fed for quick growth.
2. Breed deficiencies - low potential rate of gain of criollo hogs, and small litter size.
3. Disease and management problems.
4. No established markets or consumption preference.

Work on breed improvement should be continued and amplified. Work on the costs and returns of high rates of hog feeding at the campesino level should be undertaken to demonstrate the feasibility of raising corn for hog feeding. This will be of particular advantage to so called surplus corn producing areas and areas with excess productive capacity.

Beef

The advent of new transportation routes, new production areas and potential competition from pork and poultry meat are of some importance to the direction of future development of beef sources. There is some indication that pasture rotation in colonization areas will provide for fattening or even raising beef cattle. Considerable work is underway on breed and management improvement in both farm and range areas.

Production of forage for dry season maintenance promises to increase meat production and reduce death losses in the Beni and Altiplano. The effect of changing marketing patterns on costs and price are expected to leave the cattle industry in an unsettled state. Production can be expected to adjust to demand without restricting current consumption levels. Technological advances can be expected to be accepted as they prove profitable. Therefore the cattle industry is not in need of high priority attention at this time but work should continue on basic problems since solution will require considerable time.

Animal disease control will contribute substantially to production in all areas. Complete control is not feasible at this moment because of costs, shortage of trained personnel and difficulty of controlling animals in the vast areas of the Chaco and Beni, and due to lack of control on border areas.

Commencement of a disease free area, possibly in the Altiplano or Cochabamba Valley and gradual expansion of this area seems a more economical and practical solution than beginning a national campaign with present limited resources and without the full cooperation of neighboring countries.

Poultry

The high cost of domestic poultry and the presence of surplus feed-stuffs indicates that there is considerable potential for cost reduction in poultry production. Improved breeds, formula feeds and the greater availability of hatchery chicks would provide an impetus to developing an improved poultry industry.

These elements should permit considerable cost reduction whether applied to campesino flocks or to large-scale flocks. The potential integration of feed supplies, good management and large-scale flocks could lead to factory scale egg and broiler production as in the U.S.A. This would by-pass the potential benefits to farm income of smaller scale production on a campesino level.

This poses the question: Is efficiency resulting in lowest possible consumer prices the best immediate solution to increasing production or would an alternative enterprise for small scale farmers, possibly at higher costs, be of greater value to the economy? The poverty and pressure on land, particularly in the Cochabamba Valley, suggests that farm income can be helped in these areas at relatively little cost to the economy by preserving the poultry industry for smaller producers. This was the case in the Netherlands for a number of years where farmers were not permitted by law to have more than 600 grown hens. This fits the pattern of the agrarian reform law. Size of enterprise is not measured merely in hectares but also in capital invested and in value of output.

Milk

Fluid milk consumption in Bolivia is low, as in other developing countries, due to low incomes and to lack of pasteurization and refrigeration. This is compensated to some extent by the availability of imported whole powdered milk at reasonable prices. Increased fluid milk consumption will result from 1) availability, 2) changing tastes, and 3) aggressive marketing.

Cochabamba is moderately well supplied with pasteurized milk. La Paz has a marginal supply from Cochabamba, other Bolivian markets have only unpasteurized milk.

Dairy production in the Cochabamba Valley is making satisfactory progress with a number of cows producing over 10,000 pounds a year and several herds approaching this level. On the other hand there are a large number of low producing probably uneconomic cows. While dairy production could use more technical assistance the major problem currently is in milk marketing. The milk plant was established in 1960 to produce powdered skim milk for the Bolivian school lunch program under the contract with UNICEF. The plant has had difficulty in marketing all its butter and powdered milk at satisfactory prices. The plant is under the direction of CBF and has been heavily subsidized. Concentration on production of powdered milk when there would appear to be a deficit of pasteurized fluid milk, cream and ice cream appears to be a misallocation of production. Holland, Denmark and New Zealand are able to undersell most countries in the production of butter and powdered skim milk. Powdered whole milk offers scarcely more advantage. It would appear that a different pricing policy plus aggressive marketing of whole milk would offer considerable service to the Bolivian consumer and should produce higher returns to plant and producers than products that compete with low cost imported products.

Firm policy guidelines, recognizing national needs and international competition should redirect the thinking of management. Perhaps UNICEF contracts for powdered milk could be filled by U.S. Food for Peace.

The Team recommends no assistance to the milk plant under present management policies. The milk plant could perhaps be taken over by a COMBOFLA type Marketing Board or by the producers. The milk producers already have a strong producers association. While the manager appears to be relatively efficient there are a large number of employees for current output and the plant seems to be suffering from the common government complaint of political appointees.

If satisfactory marketing policies and control are established we recommend technical support particularly in market development but also part-time assistance in establishing proper feeding rates and dairy herd management. Some work of this type is already under way with Peace Corps volunteers, but should be expanded through the extension service.

4. Grain Crops

Tropical Wheat

Tropical wheat trials at Santa Cruz and Villa Montes are reported to have been promising. If farm yields reach experimental levels profitable production is possible. Several hundred Okinawans are reported to have planted

about 900 hectares of tropical wheat in 1964 which they expect to be more profitable than rice production if it makes indicated experimental yields. While this sizeable field trial could create more widespread interest in the crop we recommend considerable caution. A good many tropical countries are trying to produce tropical wheat with meager success. Brazil had a large acreage with considerable production but as acreage expanded problems with rust and disease control and fertility problems reduced average yields significantly and acreage subsequently declined because wheat could not compete with other crops.

The Team recommends no U.S.A. inputs into tropical wheat research. This can more profitably be carried out by larger and richer countries than Bolivia. We see nothing against continuing low level experimentation and promotion by the Bolivian Government but counsel against putting too much resources into this unproved enterprise.

Temperate Wheat

The question of increasing domestic production of temperate wheat faces several adverse factors.

1. The relatively low cost of imported wheat and flour.
2. The ability of certain importers to finance American wheat and flour at 5% interest charges vs. a minimum of 12% for financing domestic wheat.
3. The low value of milling by-products in Bolivia compared to their relatively high value in the U.S.S., means that U.S. flour has a price advantage in Bolivia over flour milled from imported U.S. wheat. This further disadvantages the domestic milling industry and therefore wheat production.

The fact that Bolivia produces considerable wheat in spite of these disadvantages suggests that wheat has advantage in certain areas over competitive crops. The law requiring wholesalers to buy 40% of domestic flour does not lessen this argument. The millers are not required to pay a given price for wheat but reduce their buying price to the level where domestic wheat is competitive with imported wheat. In addition if domestic flour is not available the requirement does not apply.

In the Sucre-Potosi production area domestic wheat has a freight advantage over imported wheat which helps to raise its price over the price that could be paid for domestic wheat in La Paz. On the other hand domestic wheat has considerable price disadvantage due to variable quality and small lots. The cost of purchasing, cleaning, grading and standardizing small lots of wheat reduces considerably the farm value of wheat. By increasing market efficiency the farm value of domestic wheat will be increased. Increasing production efficiency could also increase farm income and permit more domestic wheat to be raised replacing imported wheat and foreign exchange.

Significant improvement in the quality and utilization of temperate wheat could result from 1) the adoption and wide dissemination of a superior variety or even trading seed of this variety for equivalent amounts of

campesino wheat, and 2) the placing of a price premium on wheat produced from the new variety. This should not be considered a plea for production of high cost wheat or for subsidizing wheat production.

A sizeable number of people are to some extent dependant on wheat production. Improving their income while at the same time freeing foreign exchange by technical production and marketing assistance makes economic sense. It also will ease the adjustment if and when American program wheat is no longer available. Under free market conditions considerable Argentine wheat should be milled in Central and Southern Bolivia.

The Team recommends that policies affecting the milling of domestic wheat be examined and that barriers to the production and marketing of domestic wheat be removed.

Rice and Other Grain Marketing

The success of CONCA in raising rice production to meet national needs is clouded by its financial loss, mismanagement and collapse. The concept of CONCA was logical, the lack of competent management and lack of guidance from USAID were significant though not the only reasons for its collapse. The misjudgments in price level established for rice were no worse than made by many governments more experienced and sophisticated in price management. The concept of an incentive price in reaching for national self-sufficiency and a floor price when achieving it are difficult to manage but are recognized techniques. Proper use of these techniques call for making continuing supply and demand projections and for knowledge of costs of production.

The Team recommends that a Grain Marketing Board be established to formulate price and marketing guides for rice, wheat and soybeans with authority to purchase crop surpluses or make crop loans as a guarantee of their pricing policies but with the expectation that under normal circumstances they will not enter the market. This can be expected to 1) provide a cushion during the transition from deficit to surplus production while seeking to stabilize production at the level of national sufficiency and 2) provide for storage to cover normal fluctuations in production from one year to the next.

This should not be taken as a plea for subsidies to production nor as an argument to keep producer prices high at the expense of consumers.

Corn

Surplus capacity for corn production exists in many areas of the country. While growers complain of low prices little effort appears to be made to feed hogs for rapid gain. As mentioned under notes on meat the economies of feeding corn should be established and promoted.

5. Fruit

Deciduous Fruit

Proposals for increased production and drying of deciduous fruit in the southeast area should be fostered. The region will progress best from a decrease in subsistence farming and an increase in commercial farming. A concentrated drive for commercial deciduous fruit production in the area related to market potential is warranted on the basis of Bolivian imports from Argentina and Chile.

This will be successful only if quality equals the imported fruit. Improved fruit quality and modernization of current canneries should probably precede investment in new canneries. Canning is expensive and quality is reported to be quite poor. Probably dried fruit and improved wine making deserve priority over further canning. Over the next decade however, expanded production and improved technology should provide a more favorable base for the Bolivian fruit canning.

Tropical Fruit

We would recommend high priority in continuing the development of a market for tropical fruit to capitalize an excess production that currently has little or no market and to contribute to foreign exchange earnings. Better development of fruit marketing will benefit the domestic economy and will also contribute to improving transportation and marketing connections with Argentina that eventually should benefit other crops and both countries.

6. Tropical Products

Coffee

Bolivian coffee exports already amount to \$1 million a year. This is a high quality, high price coffee and therefore production and exports should be expanded. Bolivia is not a member of the International Coffee Agreement and has no restriction on its exports but will have to compete for the non-member import quota in member countries.

Careful guidance, as to varieties, cultural practices and marketing should be made available. A widespread, haphazard development could increase costs and reduce quality thereby losing some of the natural benefits that could otherwise accrue. As development will take some time producers will need additional enterprises to maintain them during this period. Production would seem to be particularly adapted to the Yungas where small farm units and high transport cost are a disadvantage to some other types of production.

Cacao

While the advantages of cacao are not as apparent as for coffee, it is a high value commodity with adaptability to Bolivia and should receive technical direction in determining its applicability.

Brazil Nuts

While the potential contribution to the national economy is not as great as for many crops improving the utilization of a natural resource and provision of labor income to a sector of the country that has little alternative commends it.

Rubber

The economics of plantation rubber development in South America seem not firmly established. Brazil has considerable experience and potential capacity in this line but is turning to the production of synthetic rubber. We advise caution in rubber development for Bolivia. High cost domestic rubber, protected by tariffs would increase costs of internal transportation and perhaps do the economy more harm than good.

Other Tropical Crops

Bolivia has the most to gain from production and export of high value commodities where transport costs are a smaller proportion of total costs. For this reason investigation of medicinal crops, spices and other high value tropical crops native or adaptable to Bolivia should begin.

7. Potatoes and Yucca

Potatoes are extensively grown and constitute the main staple of diet for rural people of the Altiplano and Valley regions. Because of the many hundreds of years they have grown here there is a great number of varieties, many of which are of low quality. Production practices provide only modest to low yields and in the Altiplano summer frosts often greatly reduce good supply. Studies at the Toralapa and Belén Experimental Stations indicate that use of good seed of improved varieties and adoption of recommended production practices could increase yields tenfold or more.

It is recommended that studies on potato varieties and production practices be continued and that the efforts to increase and distribute seed of improved varieties be increased. Increases in potato yields generally lead to a decrease in area planted with not too much increase in total supply or price. The land thus released can contribute to the production of other food and forage.

The yucca mill at Santa Cruz promises to provide an additional market in this area. Cost of production information was not available so that the extent of the market cannot be accurately judged. Experience in Brazil indicates that yucca flour can be substituted for wheat flour in bread up to a level of about 10%. Enrichment with soybean flour may be desirable to compensate for lack of protein in yucca flour. This would permit up to 14,000 tons of yucca flour to substitute for wheat flour at current rates of consumption. This would require 55,000 tons of yucca from about 5,500 hectares. The problem of mixing yucca flour with imported flour will be more complicated and expensive than milling with domestic wheat. Brazil's experience indicates that legal requirements are necessary in order to compel use of yucca flour at this level.

The present yucca mill is capable of producing only 6,000 tons per year on an 8-hour shift which may be adequate for present demand. Experience with this plant is essential before projecting any expansion.

Yucca also used for food and production from the Yungas is now competing with potatoes in the La Paz and Cochabamba markets. The crop is widely grown for home consumption and feed in tropic areas and has few important production problems.

SECTION III

AGRICULTURAL EDUCATION, RESEARCH AND EXTENSION

A. Education

An improved agricultural education system at all levels is essential for Bolivia to develop its agriculture potential and thereby contribute to the economic and social advancement of its people, especially in rural areas. Approximately 70% of the population of Bolivia are dependent upon agriculture for subsistence and or income. It therefore appears mandatory that special attention be given to upgrading agricultural education in order to capitalize on the countries agricultural resources for increased domestic and foreign trade. The upgrading to include both staff and physical facilities.

It is recognized that the establishment of an adequate education system takes time and requires resources, both financial and human, which Bolivia has in limited supply. Nevertheless, the country must make the necessary commitment of resources to education to assure its future economic growth and development. It is further recognized that Bolivia has made considerable progress in developing education in recent years. However, lack of coordination has frequently resulted in poor use of limited available human, financial, and physical resources.

Low salaries for teachers at all levels of education reduce the incentive for young people to enter the education profession as they have difficulty making a living compared to other vocations. This situation has encouraged many professionally trained people to seek employment outside of Bolivia, thereby further reducing the available trained manpower in Bolivia.

With this brief review of the existing situation, the following recommendations are submitted in an attempt to improve agricultural education so essential to Bolivia's future.

1. Higher Education

a. At this time Bolivia cannot adequately support more than one institution of agricultural education at the University level. Therefore it is suggested that for the present time major emphasis be aimed at strengthening the program of the College of agriculture at the University of Cochabamba. In developing agricultural education at Cochabamba the program should be broadened and its name might appropriately be changed to the "College of Agriculture and Natural Resources." The program should include instruction in the following, but not limited to those listed:

- (1) Agricultural Economics, Farm Management, and Marketing.
- (2) Agricultural Sciences.
Soil, plant, and animal and all subjects related thereto that will benefit all areas in Bolivia.
- (3) Agricultural Education.

Teaching and Extension.

- (4) Resource development and conservation.
Soil and water
Forestry
Wild life and fisheries.
- (5) Pre-Veterinary Science - At sometime it may be appropriate to locate all veterinary training at Cochabamba.
- (6) Develop procedures for close working relations with all agricultural research stations. This might include special training and work experience for advanced students at one or more stations in representative parts of the country.
- (7) Develop a continuing short course program of in-service training to up-grade extension workers and agricultural technicians employed in agriculture and rural development.
- (8) Select and advance teachers according to merit and increase rate of pay to make the profession competitive with other employment requiring comparable training and ability.

b. Create a faculty and curriculum in Homemaking Education at University of Cochabamba. Presently there is no University level Homemaking education available in Bolivia. Such training is essential to prepare teachers of Homemaking and Home Demonstration Extension Agents. This program could be established as a department in the College of Agriculture in Cochabamba coordinated with the program in Agricultural and Extension Education.

In implementing the above recommendations to strengthen Agricultural and Homemaking education at the University level consideration should be given to the following.

1. Establish a contract with a Land Grant University to provide a staff to assist with implementation. Such a contract could replace the United Nations project which is scheduled to be terminated in February 1965. For a Land Grant University contract to be effective it appears mandatory that the University agree to the following conditions:
 - (a) That the University administration including the Dean of Agriculture have the authority to make changes in the Agricultural curriculum and staff assignments to effectively strengthen the course of study including research in agriculture.
 - (b) That professional staff salaries be increased and based on merit, to facilitate the employment of the most competent full-time teachers and researchers to serve as counterparts to contract personnel.
 - (c) That the government of Bolivia and the University develop plans giving evidence of how the program will be continued following termination of contract.
2. Evaluate the desirability of establishing a University of Agriculture as an independent institution but a part of the University system in Bolivia.

3. Provide for adequate and continuing financing by Government of Bolivia, USAID, and other agencies as appropriate with plans for all financing to eventually come from within Bolivia.

1. Secondary Education

Agricultural education at the secondary level is provided in so-called practical schools and in schools supported and administered by various religious groups. These institutions are distributed about the country and all have limited facilities and faculties. Admission requirements, courses of study and faculty competence vary considerably among them.

The need for training in agriculture on the vocational level seems very evident as a means of increasing the competence of future farmers and technicians working with agriculture. The same situation appears to be true in homemaker education for young women. However, time did not permit the team to make a complete study of the needs and potential of either agricultural or homemaker education at the secondary level. Therefore, it is recommended that such a study be undertaken by a qualified team in the near future. This study could be appropriately supported by USAID and should include a thorough analysis of the present situation and future needs for vocational agriculture and homemaking education in Bolivia. Additional investigation may confirm the need for a study of the entire education system in Bolivia which would include the above recommendation.

In any event it is recommended that vocational agriculture and homemaking education be up-graded and consideration be given to integrate this instruction as a part of secondary education in both rural and urban areas.

B. Research

A major purpose of research is to provide guide lines for and to anticipate results of future courses of action. In this context research is an essential arm of effective government and wise administration. The type, quality, and amount of research that should be conducted in Bolivia depends on the willingness of the people to adopt change as well as on the availability of finances and qualified personnel to carry out the investigations.

To date agricultural research in Bolivia has been done almost entirely at 12 experiment stations through the supervision and support of U.S. AID, Servicio Agrícola Interamericano in cooperation with the Minister of Agriculture. One station at Cochabamba has been turned over to the University. Members of the U.S. Team have visited seven of these stations (Saavedra, Patacamaya, Riberalta, Trinidad, Chinoli, Toralapa, Cochabamba). The station at Santa Ana was viewed from the air and some members of the Team were near Chipiriri but were unable to complete the trip because of road conditions.

There are many research related activities being conducted under various government agencies and foreign missions. These should be closely evaluated for duplication of effort, as to whether valid information is being obtained, and whether closer coordination with research programs could result in reduced total cost and more effective programs. These research activities should be placed under or carried out in cooperation with the Ministry of Economía operations in livestock improvement and tropical wheat at Todos Santos and the fruit nursery near Cochabamba; the Bolivian Development Corporation's pre-colonization farms at Villa Montes and Bermejo and the cattle center at Reyes, Beni.

Some other services such as the veterinary diagnostic clinic should be performed in close association with research. A competent veterinary diagnostic service requires frequent consultation with specialists in such diverse areas as pathology, virology, and bacteriology. Research scientists can serve in this consultant capacity if the activities are centered at the same location and are closely coordinated.

Foreign missions involved in research or research related activities in the agricultural sector in addition to SAI include the British Team for tropical agriculture, various units of FAO and the tropical forestry unit supported by West Germany.

Work at the experiment stations to date has been predominantly concerned with development of facilities. Only a few of the stations have initiated well planned investigations or started to collect quantitative information. Statements made by station personnel indicated plans are under way to carry out valid research programs. This movement toward sound research procedures should be made a requirement.

The Experiment Stations have been located to represent broad differences in climate, soils and geographic area. Since financial support and trained personnel are limited it seems advisable to concentrate major research efforts at about four of the stations and to use such others as may be justified for practical trials and demonstrations. These demonstration farms should be made as nearly self supporting as possible.

In addition to the work carried out at the experiment stations there is a need for a central research group to carry out studies on economics, marketing, rural life and resource use on a broad national scope. Such nation-wide studies would furnish guidelines to the most needed research at the various stations as well as assist the government in policy and management decisions pertaining to natural resources.

Recommendations

1. Establish a Division of Agricultural Research within the Ministry of Agriculture and place under it the various experiment stations and demonstration farms now operated by SAI and such other similar units supported by funds of the Bolivian government.

2. Concentrate major research personnel and effort at Belen, Saavedra, Cochabamba, Trinidad and Chipiriri. A smaller research program should probably be continued at Chinoli. The areas of specialization for each would include:

- (a) Belen - Forage and livestock production and soil management and irrigation for the Altiplano.
- (b) Cochabamba - Crop and livestock production, irrigation and soil management for the valleys area. Since this station is now under the university means should be found to coordinate these studies here with those at other locations.
- (c) Saavedra - New crops, crop production, livestock and related studies for the Santa Cruz area.
- (d) Chipiriri - Crops, hogs and poultry for the tropical areas.

(e) Trinidad - Cattle and horse production in the pampas.

(f) Chinoli - Retain on a limited basis for research and demonstration to serve people of the area.

It is anticipated that personnel and research facilities would be greatly strengthened at each of the above stations and advisory help be given to insure a high quality of effort.

3. If funds and personnel are available in addition to the needs at the above stations then practical demonstrations and field tests should be carried out at some of the other stations. In many cases personnel at the major stations could supervise work at related locations - e. Belen to Patacamaya; Cochabamba to Toralapa, Chipiriri to Riberalta and Trinidad to Santa Ana and Magdalena.

4. Develop close working relations between experiment station and extension personnel. Where possible extension personnel should be officed at the experiment stations and should participate in planning station programs and take the lead in field days and short courses.

5. Establish a central Research Service under the Division of Agricultural Research.

Research not limited to the experiment stations can be best done by a central research group. This central group should be men of the highest quality and their responsibilities should be country wide. Because of their broad responsibilities and distinctive capabilities they should also serve as advisers and associates in planning for work at the experiment stations. Some of the units that should be located in this group are:

- (a) Research personnel responsible for characterizing, inventorying and developing use plans and criteria for best use of renewable natural resources. This includes:
 - (1) Soil survey and related soils investigations.
 - (2) Water and irrigation investigations.
 - (3) Forest inventory and research.
 - (4) Wild-life and recreation studies.
- (b) Research personnel in economics and marketing. Needs for these studies are emphasized in other sections of the report. Particular emphasis should be placed on the evaluation of returns from investments in various programs.

Marketing research should consider possibilities for export as well as the internal needs of the country. Marketing research may well expand into practices and procedures for improving products to meet market demands and the development of new products. This economic group would also be responsible for collecting and analyzing agricultural statistics.
- (c) Studies on motivation and cultural changes.

The adoption of new practices by people is influenced by their cultural background as well as by economic considerations. Studies on cultural traits, community organization, and existing institutions, in relation to change and motivation should be rewarding. Some studies are being initiated in this area. These should be coordinated and expanded as needed.

(d) Special studies on livestock parasites and diseases.

Since expensive facilities and a group of specialists are needed to make progress on these complex problems, centralization of effort is almost essential.

6. Financial support of research as well as planning and evaluation should be on a project basis with complete plans and reports being reviewed not less than once each year.

7. Improve salaries and working relationships so that the most capable personnel can be retained. Frequent changes in personnel hinders research progress and little research of any value is done by men of limited capability.

8. Agricultural research in Bolivia by all foreign missions should be in cooperation with the Division of Agricultural Research. In order that the efforts may be properly coordinated a planning committee should be established consisting of the head of the Division of Agricultural Research and the leader of each mission.

9. The conduct of this research should be by Bolivian specialists under the supervision of the division of research of the Ministry of Agriculture. Since, however, adequately trained and experienced researchers are not now available in all areas needed it is proposed that U.S. technical assistance be continued for at least five years. During this period technical assistance should gradually be phased out as Bolivian specialists demonstrate capacity to carry on the investigations. High quality technical assistance in research could be best provided by contract with a Land-Grant University or the U.S. Department of Agriculture. This relationship would be particularly appropriate if the British Team provides assistance in studies on tropical agriculture.

C. Agricultural Extension Service

Starting in 1953 and continuing until January 1961 the Agricultural Extension Service in Bolivia was directed, and financed by Servicio Agrícola Interamericano (SAI). In this organization the Extension Service like other divisions of SAI was jointly financed by the Bolivian Government Ministry of Agriculture and the ICA/AID Mission in Bolivia.

During this eight year period the Extension Service established 59 offices staffed with an equal number of agricultural agents and about 50 home agents. This staff was trained by U.S. extension advisors and they developed and carried out an Extension program including agriculture, home demonstration, and 4-S club work. Technical assistance was provided by USAID advisors located in La Paz, Cochabamba and Santa Cruz. The annual budget for this period was more than \$b. 2,330,000 excluding the 60 vehicles and their operating costs used for field work. This expense was handled by the general budget of SAI.

On January 4, 1961 the Extension Service was transferred to the Ministry of Agriculture under an agreement that the Bolivian Government would finance the \$b. 2,300,000 annual budget of the Service. However, due to poor timing and planning the needed funds were not made available and therefore it became necessary to close offices and reduce staff by approximately 50% during the next year and one half. This cut in funds drastically curtailed the extension program and steps were taken in 1962 to rebuild the organization and obtain additional financing from Government of Bolivia and USAID. (see AIRGRAM TOAID A 648 dated

October 1962). In addition a special effort was made to publicize the value of extension work with rural people and to sell the program to Bolivian government officials.

These efforts have paid off to enable the Extension Service to rebuild its staff and expand its program with offices in 51 of the 94 provinces and a greatly strengthened national office staff in La Paz. During this period 18 Bolivian technicians have received state side or third country education and a strengthened in-service training program has been established to up-grade the total extension staff. The three USAID extension advisors have been very effective in assisting the development of the Bolivian Extension Service through this difficult period and it is essential that this assistance be continued.

To enable the Bolivian Extension Service to further strengthen its program and effectively serve all rural areas of Bolivia the following recommendations are submitted.

Recommendations

1. That the Government of Bolivia adopt appropriate legislation to legally establish the Extension Service as an agency of the government including authority for necessary financial support, to provide for realistic growth of staff in numbers and competence and in addition provide for needed operating costs.

2. Eliminate and or transfer to the Extension Service with provision for funding as appropriate all agricultural extension type work for rural areas now being conducted by other agencies of government. This action is aimed at the elimination of duplicating services and to make more effective use of the limited supply of trained technicians. For similar reasons extension work of international technicians should be channeled through the existing extension service.

3. Broaden the scope and program objectives to include rural development as a major responsibility of the Extension Service in addition to the traditional programs in agriculture, home demonstration and 4-S club work. The implementation of this recommendation will require careful planning and considerable agent training over a period of time.

4. Provide more program supervision and appropriate specialist assistance to all provincial agents. This can be done through the establishment of regional Extension Centers located in La Paz, Cochabamba and Santa Cruz. Additional regional or area centers might be established as future study and available funds dictate. The present three positions of USAID extension advisors should be continued in present locations with Bolivian counterparts to direct work in the region.

5. As funds and technical staff become available extension work should be expanded to effectively serve all provinces in Bolivia. This does not imply that an extension office or staff is to be established in each province as some may be more effectively served from an area center responsible for several provinces. Plans should be prepared and made known to appropriate authorities to provide for steady growth of Extension work to meet demands and needs of rural people.

Constant attention must be given to up-grading staff and the payment of adequate salaries to maintain and attract competent personnel. New positions should not be established until and unless existing staff and programs are adequately supported.

6. In so far as practical the provincial office space and gas and oil expenses of vehicles should be provided from sources within the province. Such a policy is intended to indicate local interest and support for extension work. To facilitate and implement this policy local sponsoring committees should be established to support and guide the extension program.

7. Improved and expanded information services are needed to effectively reach more people. To start such improvements, necessary equipment and personnel might be located at the regional centers (see recommendation 4).

8. Extension personnel at all levels must develop and maintain effective working relationships with the agricultural research and demonstration centers, peace corps, Heifer project, schools and such other agencies as may be helpful in carrying out their extension responsibilities.

9. The employment by USAID of a qualified person to advise the Extension Service on a national basis and assist in its development appears very essential. The individual employed to fill this position should be experienced in extension program development, organization, and administrative management at the state and/or the national levels. This position should be filled as soon as possible and be continued for two years to advise the national extension office in effecting the following changes to strengthen the extension program.

- (a) Establishment of district and/or area extension centers.
- (b) Obtain more effective supervision and specialists assistance for all provincial agents.
- (c) Develop in-service training program to broaden the scope and program objective to include rural development.
- (d) Establish procedure and develop criteria for program and staff evaluation.

SECTION IV

ORGANIZATION OF RURAL DEVELOPMENT FUNCTIONS

The Team's review revealed areas of duplication between the Ministry of Agriculture and other agencies of the Government. (Ex. 1). This was particularly apparent in the field of agricultural extension and agricultural research.

It is the opinion of the Team that the development of a complete rural improvement program requires the joint efforts of the Ministry of Agriculture and of the direction of Rural Development of the Ministry of Asuntos Campesinos. The activities of the two agencies supplement and in some cases duplicate those of the other. Both groups work with rural people and both use extension methods and demonstration in their attack on rural problems.

It appears to the Team that greater utilization of manpower, funds and facilities could be achieved through bringing together the rural development activities of both agencies as a part of a larger organization providing for the improvement of rural people and the conservation and management of land, water and related resources.

A. Objectives or Reorganization:

1. Combine government agricultural functions as much as possible into one responsible organization to facilitate decision making, coordinate policy, reduce duplication, obtain better use of funds and efficient utilization of staff.

2. Organize agencies responsible for problems of resource conservation and use, into closely integrated units, realizing that farming is but one use of natural resources, others being grazing, soil conservation, wild-life, fisheries, recreation, and water use and development.

3. Control finances so that attention may be directed towards priority areas, and so that program funds can utilize personnel already available and minimize competition for available trained personnel.

4. Integrate SAI into the Bolivian Government and develop a strong national agricultural service capable of providing sound technical knowledge in the field of agriculture and conservation and use of natural resources.

B. Recommendations

It is recommended that the rural development functions of the Ministry of Asuntos Campesinos and those of the Ministry of Agriculture, together with supporting functions, be merged into one organization to be known as the Ministry of Rural Development. (Ex. 2).

It is recommended that at the Ministerial level there be a professional staff on which the Minister may call for technical advice, and a council composed of the heads of agencies involved in colonization and rural development. Through the council it is expected that plans for rural development by various agencies will be discussed and arrangements made for the Ministry of Rural

Development to assume at the appropriate time responsibility for rural development, including education, extension and research, civic action, and community development. In relation to colonization projects assumption of responsibility by the Ministry of Rural Development would be concurrent with the campesinos moving onto the land.

The Ministry will need the support of external agencies furnishing funds to the GOB, as well as support from agencies of government. If necessary, assurance of this support should be imposed at the highest level of authority through the power to allocate funds.

A Director General is provided who will be responsible to the Minister for the operation of the Ministry as a whole, thereby relieving the Minister of the need to spend time dealing with routine administrative matters. The incumbent of this position should be a technical officer who has also had administrative experience and should be a career official so that he will be able to continue in office irrespective of changes in Ministers, thus assuring a continuity of the Ministry's operations.*

Activities of the new Ministry would fall into two categories: (1) those functions dealing directly with rural development and rural projects and, (2) those functions necessary to provide technical information and services essential to a progressive rural development program.

The organization of the new Ministry provides for a centralized business management office under the Director General. We feel this is essential in order to obtain the degree of financial and administrative flexibility that will be essential to the prompt implementation of projects. The role of this office is so vital to the total effectiveness of the Ministry that a complete overhaul of the present administrative operations of the Ministry of Agriculture should be a first step in the reorganization of Rural Development functions.

Attached to the office of the Director General is an information office to serve the interests of all departments of the Ministry. It has been placed at this level in order that account can be taken of high level policies of the Ministry and its public relations.

An office of Internal Audit is provided on the staff of the Director General. It will operate independently of the business administration office.

The plan contemplates the transfer to the Ministry of Agriculture of Servicio Agrícola Interamericano functions. Such transfers should be carefully programmed and should be accompanied by a firm agreement for control of funds such as prepared by the business office of SAI for use in the proposed transfer of experiment stations.

In order to minimize the program and administrative staff in the La Paz office and bring the administration of programs nearer to the area of need the operations of the new Ministry should be carried out through regional offices.

*The plan for the organization of the office of the Director General was set forth in a report by Victor W. Bruce, Chief, Organization of Agricultural Service Branch, Food and Agricultural Organization, Rome, Italy, September 27, 1963.

This would also provide the means for obtaining uniformity in the application of policy, facilitate the institution of new programs and simplify problems of supervision.

The functions of the regional offices would also include planning functions in which agencies working in the region would participate.

To fit into this concept the Extension service will have to broaden its field of activity to meet the varied requirements of a rural development program in all provinces.

It is anticipated that some time will be required in which to complete the organization of the new ministry. In order to prepare the ground and smooth the integration of activities the following steps are recommended.

1. Complete as rapidly as possible the transfer of SAI functions to the Ministry of Agriculture.
 2. Eliminate duplication in administrative operations of the Ministry of Agriculture and effect changes in practices and procedures necessary to bring a high degree of efficiency to the conduct of the business affairs of the Ministry. The staffing of all divisions should be carefully examined to assure that employment is reduced to a minimum and that no more staff is maintained in La Paz than is absolutely necessary.
 3. Transfer to the Extension Service all agricultural extension type work for rural areas now conducted by other agencies of government.
 4. Establish within the Ministry of Agriculture, a division of Agricultural Research, with responsibility for all research and demonstration farms.
- The division would coordinate work on the experiment stations and farms and would also have a central research group that would be responsible for research in agricultural economics, agricultural statistics, marketing, the inventory, management of renewable resources and other rural problems of national significance.
5. Set up the Ministry of Agriculture a division of agricultural co-operatives.
 6. Establish a division of marketing to have supervision over operation and development of marketing boards, and establishing and regulating grades and standards.
 7. Strengthen soil and water conservation, range management and forestry work to improve the utilization of soil and forest resources and to protect against uneconomic exploitation.
 8. Draw all colonization development into one agency under CBF and set up staff functions for selection, planning and implementation that will service present and future colonies. Transfer to the colonization agency those colonization functions now performed by the Ministry of Agriculture. Rather than duplicate resources available in the Ministry of Agriculture the colonization agency should utilize the technical services and economic data available in the

Ministry in the formulation of projects and those responsible for the allocation of funds should require that these services be used.

9. Small irrigation efforts should be consolidated within the new Ministry which should also manage the Angostura and Tacagua projects. The Villa Montes project should be kept with the colonization program.

10. Transfer the Meteorological work of the Ministry of Agriculture to a more appropriate agency. Meteorological stations should be continued at the research stations.

11. The Team believes that security of tenure is essential to the development of public servants of high competency and it is recommended that USAID give support to the establishment of a national civil service system.

12. It is recommended that a Team of advisors consisting of a specialist in public administration, an economist and a person experienced in the general field of agricultural research be available for up to two years to guide the process of reorganization.

APPENDIX A

Conferences, Interviews and Visitations by Team in Bolivia, S. A.

I. Officials (Bolivian and other Nations)

Mr. Arturo Fortún Sanjines, Minister of Agriculture, Livestock and Colonization.
Dr. Oscar Gandarillas, Sub-Secretary, Ministry of Planning and Coordination.
Mr. Eduardo Arauco Paz, Minister of National Economy.
Mr. Alfredo Oporto C., President, Board of Directors, Agricultural Bank of Bolivia.
Eng. Alberto Valdez, Acting General Manager, Agricultural Bank of Bolivia.
Father Leónidas Sánchez, National Director of Cooperatives.
Dr. Alipio Valencia Vega, President, National Agrarian Reform Council.
Mr. Juan Pascoe, United Nations Representative.
Mr. Antonio Perla, Interamerican Development Bank Representative.
Mr. Alasdair F. MacKenzie, Chief, British Tropical Agricultural Mission.
Mr. Hugo Torrez Goitia, National Director of Rural Development.
Mr. Milton J. Lobell, and Staff, Director Rural Development, USAID/B.
Mr. Alexander Firfer and Staff, Director USAID Mission Bolivia.
Mr. Douglas Henderson, U.S. Ambassador to Bolivia.
Mr. Percy Aitken, Manager COMBOFLA.

II. National Institutions that are conducting Rural Development Projects

Ministry of Agriculture, Livestock and Colonization
Ministry of National Economy
Ministry of Indian Affairs
Ministry of Planning and Coordination
Ministry of Public Works and Communications
Ministry of Mines and Petroleum
Bolivian Development Corporation (C.B.F.)
Bolivian Miner Corporation.
Bolivian Agriculture Bank.
National Council of Agrarian Reform.
National Direction of Cooperatives.
Universities.

III. International Organization giving Technical or Economic Assistance for Rural Development.

USAID/B.
United Nations.
Interamerican Development Bank.
Tropical Agricultural British Mission.
Peace Corps.

IV. Colonization Projects

Okinawa Colonies 1, 2, 3, Santa Cruz
San Francisco Colony, Chapare
Colonization Area No. 4 - Northwest zone of Santa Cruz - Southwest of Yapacani River.
Aroma Colony - Santa Cruz
Several example of spontaneous colonization. Santa Cruz and Cochabamba areas.

V. Agricultural Experiment Stations

Valley Experimental Station - La Tamborada - Cochabamba

(Transferred by SAI and actually operated by the San Simon University under contract with the Ministry.)

- (a) Investigation on cereals, wheat, barley, oats, corns.
- (b) Investigation on forages, legumes and gramineous.
- (c) Investigation on vegetables.
- (d) Soils laboratory and tests of fertilizers, insecticides, herbicides, etc.
- (e) Practical training to students of Faculty of Agronomy and Agricultural Practical School.
- (f) Studies of small irrigation works.
- (g) Dairy farms.
- (h) Poultry farms.

Center of Livestock Improvement "La Muyurina," Montero, Santa Cruz

(Transferred by SAI and actually administered by Salesian Fathers under contract with the Ministry).

- (a) Breeders of Santa Gertrudis, Browns Swiss and Holstein for sale of stock to farmers.
- (b) Hog breeders for sale to farmers.
- (c) Poultry farm.
- (d) Demonstrations on cattle and pastures handling.
- (e) Practical teaching to students of Practical School of Agriculture administered by Salesian Fathers.
- (f) Occasional technical assistance to neighbouring farmers and ranchers.

Experimental Station of the Llanos General Saavedra - Santa Cruz

Investigations on sugar cane, rice textiles, oleaginous, forages, vegetables, corn, citrus, fertilizers, insecticides, herbicides, coffee, cacao, cultural practices, rotation of crops, seeds multiplication. Hog breeders rise of Poland China and Duroc Jersey breed, etc.

Tropic Experimental Station - Riberalta - Beni

Investigations on rubber, cacao, coffee, brazil nuts, citrus, vegetables, rice, corn, rubber laminations.

Center of Ovine Cattle Improvement - Patacamaya - La Paz

Work on ovine and cattle improvement, llamas and forages, cattle and pasture handling. Corriedale breeders raise for distribution to ranchers. Capacitation courses for Extension Agents and farm leaders, etc.

Chinoli Demonstrations Center - Potosí

Improvement work on wheat, barley, oats, potatoes, alfalfa, pastures and bees. Tests of fertilizers, insecticides. Short training courses for farm leaders.

Toralapa Demonstration Center - Cochabamba

Works with potatoes, native tubers, sheep, pastures, courses for farmers.

Trinidad Cattle Station - Beni

Works with meat cattle, forages, vegetables, fruits, artificial insemination, courses for cattle men.

VI. Universities and Practical Schools

1. "San Simón" University - Cochabamba

a. Faculty of Agronomical Sciences. Graduates Agronomist Engineers.

2. "Gabriel René Moreno" University - Santa Cruz

a. Faculty of Veterinarian Medicine. Graduates Veterinarian Doctors.

b. Agricultural Practical School - Graduates Expert Agronomists.

3. "Misael Saracho" University - Tarija

a. Agricultural Practical School - Graduates Expert Agronomists.

4. Practical School in Agriculture "Muyurina" - Santa Cruz

In charge of the Salesian Fathers. Graduates in Bachelor Technical Agronomists.

5. Practical School in Agriculture "Fátima" - Cochabamba

Also in charge of the Salesian Fathers. Graduates in Bachelor Technical Agronomist.

VII. Other installations, projects and areas visited

Agricultural Extension Division La Paz, Cochabamba and Santa Cruz departments.
Todos Santos Complex.

Project of tropical wheat development (Santa Cruz)

National Fruit Nursery (Cochabamba)

Guabífa Sugar Mill (Santa Cruz)

Experimental Station (Villa Montes)

Milk Plant (Cochabamba)

Agricultural Properties of COMIBOL

Forest Nursery (Cochabamba)

Yucca Mill - Santa Cruz

Rice Mills - Santa Cruz

The above list is not intended to be all inclusive but rather give the reader a sampling of individuals interviewed and projected visited.

Information was gathered from many more individuals as team traveled throughout Bolivia.

APPENDIX B

PROGRAM OF WORK

Land Grant College - U.S.D.A. Agricultural Team to Bolivia, S. A.

April 12 - June 9, 1964

April 12-14	Team members Anderson, Butler, Gardner, Hansen and Osborn, assemble in Washington, D.C. and meet with U.S.D.A. and A.I.D. officials for briefing on April 31 and 14.
April 14	7:30 p.m. Depart National Airport Washington for La Paz - Bolivia, S. A.
April 26	Team meeting with A.I.D. and G.O.B. officials.
April 26-May 2	Team travel to Santa Cruz visit projects and interview people in Santa Cruz area.
April 27	Anderson arrive La Paz from Washington, D. C.
May 3-May 10	Interviews with agencies in La Paz and visits to projects on Altiplano.
May 11-May 19	Team divided to visit projects in Cochabamba and Tarija areas.
May 17	Thorne arrive La Paz from Utah.
May 21-24	Thorne and Gardner visit Cochabamba. Thorne continue on to Santa Cruz. Other Team members in La Paz.
May 25-June 5	Prepare report and discuss recommendations with A.I.D. officials in La Paz.
May 26-28	Thorne visit Experiment Stations in Beni area.
June 5	Team departs La Paz for Washington, D. C.
June 6	Arrive Washington, D. C.
June 8-9	Team confer with U.S.D.A. and A.I.D. officials on recommendations of report.
June 9-10	Team returns to regular duty assignments.

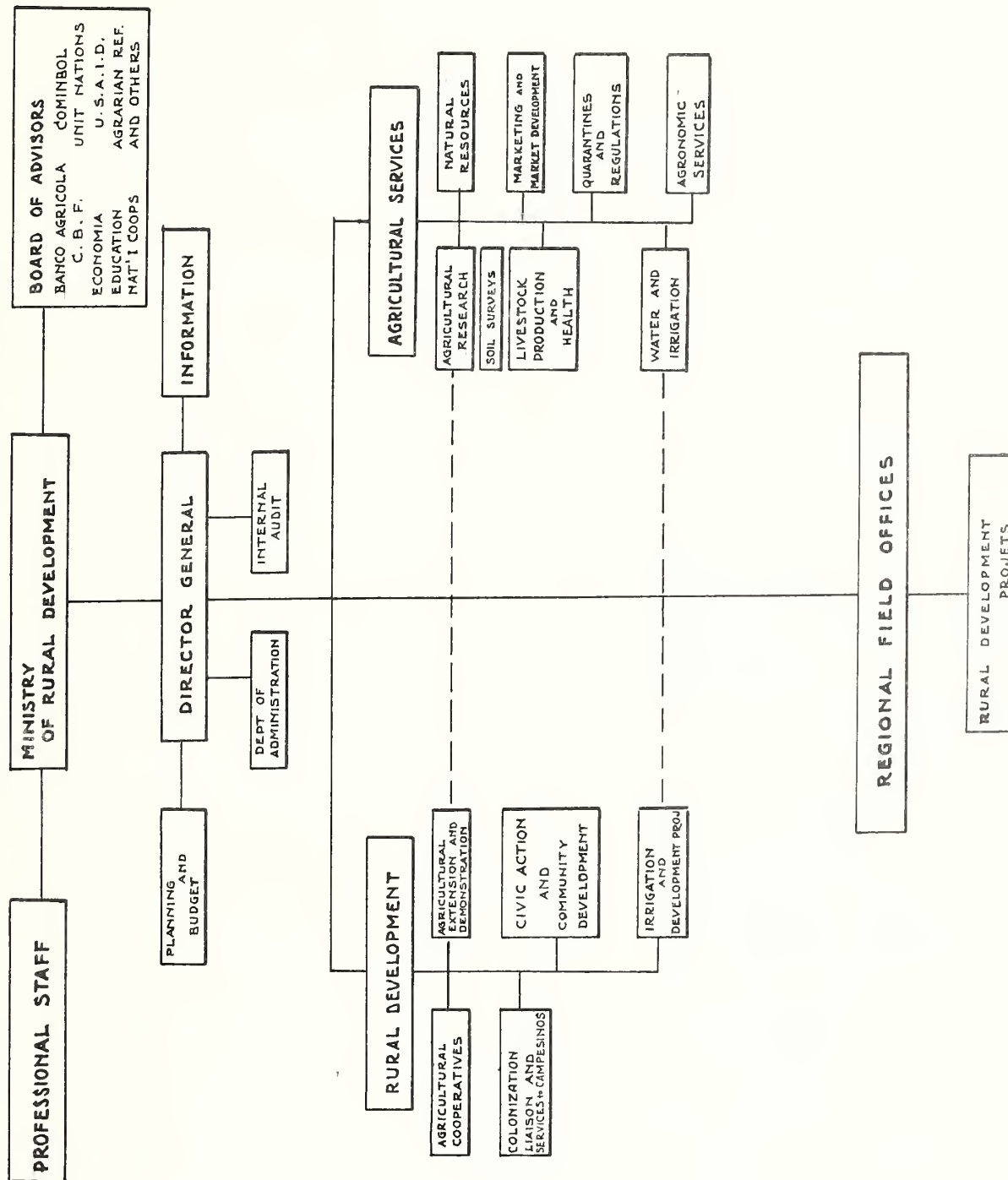
AREAS OF DUPLICATION IN AGRICULTURAL FUNCTIONS 1/
WITHIN BOLIVIAN INSTITUTIONS

Functions Organizations	Research	Extension	Colonization	Agricultural Cooperatives	Artificial Insemination	Irrigation	Soils	Poultry	Nurseries	Rural Industry
Ministry of Agriculture	X	X	X	X		X	X	X	X	X
Ministry of Indian Affairs		X	X	X	X	X	X	X	X	
Ministry of Defense			X				X	X	X	
Ministry of Economy	X	X	X		X				X	X
Servicio Agrícola Interamericano	X	X		X	X		X	X	X	
Bolivian Development Corp.	X	X	X	X	X	X	X	X	X	X
National Coopts.			X	X						
Ministry of Public Works						X				
Bolivian Miner Corporation			X							

* Taken from table supplied by
Secretaría Nacional de Planifi-
cación y Coordinación.
Organización Técnica Adminis-
trativa en 1963.
Revised to 1964.

AREAS OF DUPLICATION IN AGRICULTURAL FUNCTIONS BY FOREIGN TECHNICAL ASSISTANCE MISSIONS

Funciones Organizaciones	Research	Extension	Colonization	Agricultural Cooperatives	Artificial Insemination	Irrigation	Soils	Poultry	Nurseries	Rural Industry
USAID/B.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
U. N.	✓	✓	✓	✓		✓	✓	✓	✓	✓
Propseal Agr.										
British Mission	✓		✓				✓		✓	
I.D.B.		✓	✓			✓			✓	
Peace Corps	✓	✓	✓	✓	✓			✓	✓	✓
Global Engineering			✓			✓	✓			
OSFAR	✓									
Israeli Mission		✓		✓						
International Committee of European Migrations			✓							



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1964

